C3975-1

DECEMBER 1986

FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS

1987 EQUIPMENT CATALOG AND BUYERS' GUIDE

1986 Volume 113 Number 12

DECEMBER

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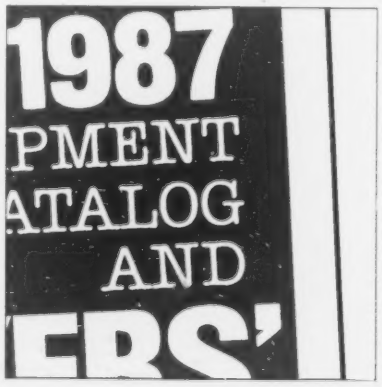

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Coalition to oppose single-use setasides

PORTLAND, ORE.—Seven timber-related groups in Washington and Oregon have formed an environmental coalition called Citizens for Perpetual Resources to provide a voice opposing excessive government restrictions and single-use forest withdrawals.

Top priority will be a response to the U.S. Forest Service proposal to set aside 2200 acres of forest lands for each pair of spotted owls in Northwest national forests. Davidson Industries sawmill supervisor Del Phelps, Mapleton, Ore., is president. ■

Improved markets aid third-quarter earnings

SAN FRANCISCO, CALIF.—Better pulp and paper markets and improved prices for building products added up to a booming third quarter for most major forest products corporations.

Labor factors in the solid-wood industry made plus and minus contributions. Some West Coast mills in the U.S. lost production to a strike which hit several companies in August, but settlements involving compensation cuts were cited as progenitors of sustained profitability in the future.

A continuing work stoppage in British Columbia, however, has suppressed production and revenues north of the border—bad for Canadian companies affected but good for profits of U.S. lumber companies which took up the slack at home.

The table on this page summarizes figures reported by several companies. Note the high percentage gains in the earnings column, even in cases where sales are only slightly up or have fallen from last year's third quarter. While integrated corporations cited strength in pulp and paper as well as a return of healthy solid-wood markets, the industry is also running a tighter ship.

While markets for the company's products were healthier, "our improving cost competitiveness remained the primary influence behind the major earnings gains for the quarter and first nine months," observed Potlatch Corp. chairman and CEO Richard B. Madden.

Willamette Industries president and CEO William Swindells Jr. made a similar observation: "Labor cost savings resulting from negotiated wage concessions, along with efficiencies created by capital investment, should combine to make (our) western building materials operations more competitive with low-cost Canadian and domestic mills."

The Potlatch wood products group turned in its third consecutive profitable quarter after suffering substantial operating losses since 1983, Madden said. The group reported operating income of $7.2 million in the third quarter of 1986 vs. a loss of $2.2 million in the same period a year ago.

Louisiana-Pacific Corp. turned in record third-quarter sales and a 55% increase in earnings. "Production and sales volumes of many of our building products reached record levels during the quarter," said chairman and president Harry A. Merlo.

Strong demand for particleboard and fiberboard paced third-quarter building products earnings of $8.8 for Temple-Inland Inc., up from $4.3 million in the third quarter of last year. "Building material markets will no doubt moderate seasonally in the fourth quarter," noted Clifford J. Grum, president and CEO. ■

U.S. forest industry results third quarter 1986 ($ millions)

Company	Sales	% change 1986/85	Earnings[1]	% change 1986-85
Boise Cascade	959,530	2.7	13,240[2]	-34.9[2]
Champion International	1,110,884	-16.5	63,834[3]	68.2
Chesapeake Corp.	161,822	1.1	6,189	80.8
Federal Paper Board	222,028	23.5	9,920	385.3
Georgia-Pacific	1,909,000	8.9	97,000[3]	67.2[4]
Great Northern Nekoosa	514,500	8.2	34,600	260.4
Hammermill Paper	442,096	6.0	15,400[5]	175.0
International Paper	1,250,000	12.6	85,000	466.6[6]
IP Timberlands Ltd.	51,000	34.2	31,000	72.2
Jefferson Smurfit	267,202	71.7	7,783	102.7
Louisiana-Pacific	407,390	22.6	22,200	55.1
Pope & Talbot	78,055	-4.7	4,278	124.8
Potlatch Corp.	249,955	4.3	16,737	48.5
Scott Paper	819,700	7.0	38,200[7]	-32.1
Southwest Forest Industries	160,527	9.7	4,015	241.3
Temple-Inland	333,800	7.4	20,100	14.8
Union Camp	515,910	11.2	36,427	80.8
Westvaco	433,043	10.5	25,938[3]	11.9
Weyerhaeuser	1,400,000	8.5	62,200	61.1
Willamette Industries	300,271	4.5	21,338	44.5

Canadian companies (C$ millions)

Abitibi-Price	716,500	13.1	31,100[8]	22.4
B.C. Forest Products	258,300	-7.0	9,500	111.1
Canfor Corp.	284,500	3.0	12,500	189.3
Crown Forest Industries	221,000	-4.0	13,200[9]	73.7
Domtar Inc.	585,000	11.3	33,500[10]	73.6
Great Lakes Forest Products	159,389	0.9	8,853	759.2
MacMillan Bloedel	657,600	10.1	31,700	161.9
West Fraser Timber	110,400	27.0	14,100	228.0

[1] Income after taxes from continuing operations, excluding most significant nonrecurring items. [2] Includes pretax gain of $6.7 million from sale of certain operations. [3] Reflects change in method of accounting that reduced pension costs. [4] 1985 quarter included $30 million loss from disposal of discontinued oil and gas unit. [5] Includes one-time pretax gain from sale of Manning Paper Co. and settlement of insurance claim equaling $3.6 million. Includes one-time pretax loss of $21.3 million for defending against tender offer. [6] 1985 quarter included $23 million charge for early retirement program. [7] Includes $38 million charge for nine-week strike at Mobile, Ala., mill. [8] 1986 quarter excludes extraordinary charge of C$2.3 million from writedown of certain assets and reflects change in method of accounting that reduced pension costs. [9] Excludes one-time loss of C$10.3 million from restructuring of Crown Stores subsidiary. [10] 1986 quarter excludes extraordinary gain of C$3.9 million. 1985 quarter excludes extraordinary gain of C$5.8 million.

JANUARY 1987

C3975-1
1/21/87

FOREST INDUSTRIES

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Economist projects moderate softwood market growth in the late 1980s, but total consumption should hit 48 to 49 billion bd ft annually in the 1990s

What the future holds for U.S. wood industry

By Bernard Fuller

Tarpon Springs, Florida

To understand where the industry is today and where it's headed, we need to look into the not-so-distant past.

For example, aggregate softwood lumber demand (domestic plus exports) in the U.S. during the 1970s went from 36.8 billion bd ft to 40.2 billion bd ft. Remarkably, that figure dropped only half a billion bd ft in the early 1980s when the country was experiencing the worst recession in 50 years. Housing starts in 1982 were down to a million, the Gross National Product was in a slump, industrial production was down, yet the industry was producing about 40 billion bd ft a year. Why? Obviously, the market was growing despite lower levels of economic activity.

Given what we saw in 1986, it is our view that total softwood lumber consumption for the late 1980s, including exports, will average between 47 and 48 billion bd ft a year. That's close to 20% above the level of the early 1980s. Traditionally our view has been that lumber is a mature market, yet we see it showing some pretty significant growth rates.

We don't see so much growth over the late 1980s, primarily because of the projected slowdown in housing starts, but total consumption should average 48 to 49 billion bd ft per year throughout the 1990s.

Growth in southern output

In the U.S., the South has shown the most rapid growth over the past 10 to 15 years. It grew from 7.5 billion bd ft annually in the early 1970s to 9.7 billion bd ft in the early 1980s, a 30% increase on average over a 10-year period.

One of the problems in the South seems to be difficulty in counting lumber. Two or three years ago an extra 3 billion bd ft per year of production was discovered. After that problem was resolved, last year's production report from the U.S. Census Bureau was below what the industry grading agencies reported. Our estimates are that the 1986 shortfall in what actually has been recorded by the Southern Forest Products Assn., National Forest Products Assn. and the Census Bureau could be anywhere between 8% and 10%. So instead of 11 billion bd ft average production, it could be closer to 12 billion. And 1985 figures were probably around 11 billion bd ft instead of 10 or 10.5 billion.

Nevertheless, we are looking for continued growth in the volume of southern pine produced, reaching about 12 billion bd ft by the end of the 1990s, on an unrevised basis. Revised figures could be closer to 13 or 13.5 billion bd ft.

Treated lumber market

Why has the volume of southern pine production increased 30% over a decade? The main driving force until now has been the treated wood business. We estimate that the treated lumber market in 1986 was in excess of 5 billion bd ft. That's triple the 1975 level. At least 80% of that volume is southern pine. Viewed another way, over 4 billion bd ft of the total 11 to 11.5 billion bd ft of southern pine lumber produced in '86 was treated.

At some point this growth rate has to flatten. Possibly the major factor that could keep the annual growth rate above a 4% or 5% trend is the significant penetration of the wood foundation market.

While wood foundations aren't new, what is new is the exposure being given them, especially by SFPA. But it remains to be seen how successful the promotional programs are going to be. A lot of stereotypes and fears about what a wood foundation means need to be overcome. For that reason, our forecast doesn't assume major growth in the wood foundation market.

By the early 1990s there should be around 250 million bd ft of treated lumber going into the Caribbean market, though some of that is going to be radiata pine and other species.

Overall, we are looking for 50% growth in total treated wood demand between now and the end of the century. That amounts to about a 7.5 billion bd ft per year market through the 1990s. And I expect some erosion of the southern pine market share; I think there will be more treated red pine, ponderosa pine and even spruce.

TABLE 1—Major supplying region shares of U.S. softwood lumber market (%)

	South	West Coast	Inland	Canada
1971-1975	20	22	26	20
1976-1980	22	21	24	25
1981-1985	25	18	21	29
1986-1990	23	19	20	31
1991-1995	23	19	20	30
1996-2000	24	19	19	30

NOTES: (1) 10% Tariff assumed. (2) Shares calculated as regional production or imports divided by total U.S. consumption plus U.S. exports. (3) No significant growth in imports of non-Canadian softwoods assumed.

Effect of tariff

The Canadian share of the U.S. market has grown from 20% to 29% and we're looking for around 31% in the late 1980s. In our projections we assumed a 10% tariff would be imposed. Though a 15% tariff has since been announced, our figures are still in the ballpark (see Table 1). Without a tariff, the Canadian share probably would have been 33%.

By placing a 15% tariff on lumber coming from Canada, there won't be a 15% increase in the price of the affected items. We expect to see spruce prices go up in the short term. We think there was about a billion bd ft of production lost in Canada in 1986 because of the strike in British Columbia.

From 1987 to 1990, on average, we are forecasting that the impact of a 15% tariff would be a drop in f.o.b. spruce prices from mills in western Canada by around 6%. Domestic prices would rise 6 to 7% (7% on western lumber and 6% on southern) and Canadian mills would lose about two points on their market share.

Housing forecasts

Through the end of the century there are several major developments taking place on the demand side. For instance, as 1986 drew to a close, housing was weakening to below 1.7 million starts. Everyone assumed demand from the Baby Boomers would keep housing at the 1.8 to 1.9 level at least through 1988. But maybe there just isn't enough "oomph" there, especially at current interest rates.

Some people think 9 to 10% interest mortgages are a bargain, but that's not the case. Mortgages must get down to 8% to tap into that high resource. We're looking at a demographic "Baby Bust" by the end of the decade because the numbers just aren't there to keep the demand for housing at the level it was in the 1970s and '80s. In the 1990s we're looking for housing starts to average 1.4 to 1.5 million starts, probably 1.6 in peak years and down close to a million in recession years. That contrasts with the 1.7 level of the 1970s and now. The only good news is that single-family housing starts will go higher.

It is inevitable that the volume of lumber and panel products going into residential construction, as a share of the total, will continue to decline at least until the end of the century.

Non-residential sector

The non-residential side over the short term is going to be sluggish because many sectors, such as office buildings and health care facilities, have been overbuilt. However, one factor that supports wood use in the non-residential market is the tendency for these units to be low-rise.

Until the full impact of tax reform is known, it could be that the non-residential sector will be flat for at least the next 12 to 18 months and won't come back until 1988. In the 1990s, though, I think you will see growth both in the total volume of non-residential construction and in the percentage of units using wood.

Growth in remodeling

The big growth area in the last two or three years has been residential repairs and remodeling.

The primary reason is high land values in some areas of the country that make building prohibitive. I think the 1990s also will be favorable for the repair and remodeling market (see Table 2). The Baby Boomers will be moving into a period of their lives when they are more likely to do major remodeling to homes they already own.

On a constant dollar basis, the average for expenditures on repairs and remodeling has trended upward during the 1970s and 1980s. And I think the long-term trend is for further increases. The reason is that, unlike the downward trend in housing starts from 1.7 to 1.4, the number of new households will continue to grow.

Slow industrial growth

The problem with industrial market growth and the use of lumber and wood products made for consumption—packaging, crating, etc.—is that industrial output hasn't grown in the past couple of years. Most economists are forecasting that at some point in the not-too-distant future, the U.S. manufacturing sector will rebound. If that happens, you'll see a bit more lumber going into these end use markets.

But I've been doing work on the furniture markets and I'm not so sure that the rebound will hold true. A major concern on the furniture side is the growing volume of import substitutions. These are coming from countries whose currencies have not appreciated as the dollar has—Korea, Taiwan and Canada. So I'm a little skeptical of the long-awaited recovery in U.S. industrial output.

TABLE 3—U.S. lumber exports (billion bd ft)

	Total domestic consumption	Exports	
		Volume	Share (%)
1971-1975	35.5	1.4	3.7
1976-1980	38.6	1.6	4.0
1981-1985	38.0	1.7	4.2
1986-1990	45.7	2.0	4.3
1991-1995	46.7	1.9	3.9
1996-2000	47.1	1.9	4.0

TABLE 2—U.S. softwood lumber end-use markets (annual averages, billion bd ft)

	Residential*		Residential repair and remodeling		Total volume
	Volume	Share (%)	Volume	Share (%)	
1971-1975	15.1	42	7.5	21	35.5
1976-1980	15.8	41	8.2	21	38.9
1981-1985	13.2	35	9.2	24	38.0
1986-1990	15.7	35	11.9	26	45.7
1991-1995	14.4	31	12.2	26	46.7
1996-2000	13.3	28	12.8	27	47.1

** Single-family, multi-family and mobile homes.*

Lumber prices low

Competitive pricing is another factor that particularly affects markets using wood products. Looking at these end use markets, if a lumber product is competitive in price, quality and performance, there will be further expansion. But the emphasis is on price! One main reason there has been significant growth in treated products and overall softwood lumber consumption in the 1980s has been the low real price. Historically, lumber prices are the lowest they have ever been in a postwar period, if not lower.

Wood usage projections

We're projecting that the volume going into domestic residential construction in the late 1980s is pretty well where it was in the late 1970s at the peak of the housing cycle. But as a percentage of the total market, it is down quite sharply. And we're saying that by the late 1990s, less than 30% of all U.S. softwood consumption will be for residential construction, including single-family, multi-family and mobile homes.

U.S. exports

Unlike the situation for Canadian mills, exports are relatively unimportant for most U.S. lumber manufacturers. We're assuming that, optimistically, exports will average 2 billion bd ft annually by 1990. The industry hasn't averaged anywhere near that in the past 15 years. And that level is only 4.3% of the total market (see Table 3). Frankly, we're skeptical about the industry's ability to increase those volumes in the 1990s because we think it is going to see a lot more competition.

In our view, Japan has to be a big growth factor if total U.S. exports are to go above the 2 billion bd ft level in the 1990s. But, suppose we are too conservative and the industry increases exports 50% to 3 billion bd ft over a 10-year period.

Even then the total would only be 6% of the market. The industry is still going to be dominated by consideration for the domestic market.

TABLE 5—Real timber values in U.S. South and West ($1985/MBF-Scribner)

	West	South
1971-1975	236	148
1976-1980	319	176
1981-1985	130	153
1986-1990	149	167
1991-1995	172	162
1996-2000	178	191

NOTE: No tariff on lumber imports incorporated in this forecast.

Timber values

If southern pine gets to be a 12, 13 or 14 billion bd ft industry, there have to be some consequences for the future. The most important one, in my opinion, relates to timber values. For example, the old U.S. Forest Service forecast from the 1970s shows southern pine growing stock on an upward plane to the year 2015. Growing stock reached 140 billion ft^3 from a level of around 90 ft^3 in the late 1970s. In the new data on removal to growth rate, the growth rate in particular is a lot lower than had been previously assumed.

We're saying that the growing stock has peaked and there is a downward trend at least through the next 25 years. After 2015, it starts going back up again. Looking at that growing stock profile, indications are it will put pressure on timber and cause real timber prices to rise.

At the same time, we are building into our forecast an assumption that a lot of plywood demand, both southern and western, will be replaced by nonveneered panels such as oriented strand board and waferboard. We see around 50% of the U.S. panel market being non-veneer by the late 1990s. Plywood will be a 14 billion ft^2/yr market compared to the current 20 to 21 billion ft^2 market (see Table 4).

If this attrition doesn't take place and the plywood market holds even at around 20 billion ft^2/yr, then southern pine removals will accelerate and so will the pressure on growing stock. Production at this level over the next three or four years will drive southern pine timber prices up faster than they would accelerate otherwise.

Current southern pine timber prices are low due to salvage cutting for beetle damage. We believe that if and when the beetle epidemic is over, most timber products will recover. Using 1985 as a basis, we see southern pine climbing above $190/1000 bd ft (Scribner scale) by the late 1990s (see Table 5).

If the 15% tariff is applied to Canadian lumber, the price would be somewhat higher. One thing our work shows clearly is that a large part of any increase due to a tariff goes back to the timber base. It goes back into the price of stumpage on the West Coast and to fee owners in the South.

While there is a growing softwood market, the industry faces an oversupply of lumber in the sense that operating rates aren't at the level mill owners would like. There is currently 15 to 20% more capacity than there was in 1979. This reflects an unusual mill phenomenon. During the early 1980s while the industry was experiencing an economic crisis, mills expanded and upgraded. I think this reflects the family ownership structure where a mill is run as long as it puts bread and butter on the table.

I think we are going to be seeing excess capacity and pressure on margins for at least the next four or five years.

I think there are market niches out there and the successful producer in the 1990s will be adding value to fill them. I think you're going to see a lot more specialty products and lots fewer mills oriented to traditional commodity products. And I think market development is crucial. Better data collection is essential for treated lumber and other products coming into the market. ■

TABLE 4—U.S. structural panel demand

	Plywood		Nonveneered	
	Volume	Share (%)	Volume	Share (%)
1971-1975	17.1	100	—	—
1976-1980	18.8	97	0.51	3
1981-1985	18.4	91	1.82	9
1986-1990	19.7	77	6.05	23
1991-1995	16.2	60	10.94	40
1996-2000	14.0	48	15.00	52

THE AUTHOR is vice president of Resource Information Systems Inc. (RISI), a Bedford, Mass., consulting company engaged in developing economic information on the international forest products industry. This article is excerpted from a presentation he made at the 1986 annual meeting of the Southern Forest Products Assn.

Though a trade bill could stir protectionist sentiment with U.S. trading partners, the overall outlook for 1987 wood exports is good. Exports in 1986 neared $3 billion

Markets up, dollar down; wood exports encouraging

By Griff Griffin

Atlanta, Georgia

U.S. industry's lack of trade competitiveness has moved front and center as a national political issue, making some sort of trade bill in 1987 almost a sure bet.

The question looming over industry in the next few months, however, is whether the forthcoming legislation will be trade restrictive or trade expansive, and nobody is anteing up for that one.

Democrats interpreted their November Senate gains as a mandate to revive the ailing industrial sector. And as 1986 ended, party leadership was formulating an aggressive trade policy with tough "fair trade" rules. Reciprocity is a key element.

A trade bill could have harsh negative consequences for U.S. exporters. Matthias Wissman, economic spokesman for West Germany's Christian Democratic Party, was quoted recently as saying that a U.S. trade bill could "strengthen protectionist elements in the European Community."

With a trade deficit in 1986 of approximately $170 billion and with industrial activity flat for over two years, the U.S. obviously has lots at stake. And the uncertainties of the new tax bill will make industrial recovery difficult at best. In fact, the nation's export/import balance is expected to largely determine its pattern of industrial growth for 1987.

Barring serious repercussions from a trade bill, the export outlook is encouraging. The prevailing view from the National Forest Products Assn. is that developments in trade policy will primarily affect imports. John Ward, NFPA's vice president of international trade, said the overall volume of wood products exports should increase by a solid 10% in 1987, up from 8% in 1986.

As a matter of perspective, however, it should be noted that the U.S. is a net importer of wood products. Imports in the first three quarters of 1986 exceeded $4.1 billion; exports were just over $2.1 billion (see table on following page). This was a 10% rise over 1985 imports for the same period. The rise was attributed largely to Canadian softwood lumber imports, which topped $2.34 billion.

By the end of 1986, a variety of U.S. wood products was showing export gains over 1985. The total value for the year was expected to be near $3 billion. In the first nine months, the quantity of softwood lumber exports was up by 20%, hardwood lumber by 33%, particleboard by 47%, softwood veneer by 33%, hardwood veneer by 27% and hardwood plywood by 33%. But the star performer was softwood plywood, with an 86% gain.

These softwood plywood gains were largely attributable to a strong recovery in European markets. Sales there accounted for between 70 and 75% of U.S. exports, according to the American Plywood Assn.

Overall softwood exports in 1986 showed only a 3% gain for the first three quarters, climbing to $1.5 billion from $1.46 billion in 1985. A large decline in exports to China and a notable drop in softwood lumber shipments to Australia hurt the total.

Hardwood exports in the first nine months totaled $400.2 million, a 24% increase over $321.7 million for the same period in 1985. Hardwood lumber showed a 36% gain, up from $184 million to almost $250 million for this period. The European Community alone increased hardwood lumber imports from the U.S. by 34%, from $63.9 million to $85.7 million.

Also in a nine-month comparison, particleboard exports showed almost a 47% gain, with sales growing from $16.2 million to $23.8 million.

Among the myriad of factors influencing export gains by individual wood products, two are notable: 1) the decline of the U.S. dollar versus foreign currency exchange rates; and 2) aggressive marketing programs conducted by various forest products associations.

NFPA's Ward said he expects to see the dollar stay down this year relative to the currencies of other major trading partners. "I think we'll see a break in the dollar relationship in 1987 that we didn't see in '85 or '86, which should provide even greater export stimulus," he noted.

Canada

Canada and the U.S. share an unusual trade relationship in that Canada is the biggest U.S. competitor in many wood markets, but it's also one of its biggest trading partners. That country was second only to Japan in 1986 as a wood products export market, with U.S. sales in the first three quarters totaling $259.8 million.

Hardwood exports overall were down slightly, from $73.8 million to $70 million. Hardwood lumber exports increased in quantity in the first nine months of 1986 over 1985 by 11%, from 99,963,000 bd ft (235,912 m^3) to 110,508,000 bd ft (260,799 m^3). Hardwood plywood increased 7%, from 11,957,000 ft^2 to 12,774,000 ft^2.

Softwood products overall were up 7% in value for this period, from $123.8 million to $132.1 million. Softwood lumber rose 24%, from 224,195,000 bd ft (529,100 m^3) to 277,476,000 bd ft (654,843 m^3). Plywood exports were up from 35,199,000 ft^2 to 41,612,000 ft^2 and veneer was up from 153,616,000 ft^2 to 185,630,000 ft^2.

Japan

Japan's efforts to stimulate its domestic economy are expected to include a significant increase in housing starts, thus increasing demand for U.S. wood products. Japan's forecast called for 1.27 million starts in 1986, with 45% of those being wood frame. Wood frame

U.S. trade balance, by commodity (January - September, 1986)

Commodity	Exports	Imports	Net Balance
		($1000)	
Softwood logs	821,728	4,685	817,043
Hardwood logs	71,475	3,445	68,030
Poles, piles, posts	15,113	10,450	4,663
Wood chips	118,604	13,787	104,817
Softwood lumber	451,360	2,359,080	(1,907,720)
Hardwood lumber	249,503	97,279	152,224
Softwood flooring	102	326	(224)
Hardwood flooring	4,846	21,903	(17,057)
Siding	550	101,822	(101,272)
Molding	7,779	84,773	(76,994)
Treated lumber, flooring, siding and molding	3,059	16,812	(13,753)
Railroad ties	3,481	2,670	811
Softwood veneer	9,869	12,427	(2,558)
Hardwood veneer	57,668	84,030	(26,362)
Softwood plywood	88,577	26,069	62,508
Hardwood plywood	9,741	361,198	(351,457)
Hardboard	18,193	43,820	(25,627)
Particleboard	23,841	105,029	(81,188)
Cellular wood panels	1,152	168	984
Gypsum and plaster board	6,519	76,382	(69,863)
Other panel products	22,728	26,644	(3,916)
Misc. wood products	183,712	669,481	(485,769)
Total	**2,169,600**	**4,122,280**	**(1,952,680)**

SOURCE: U.S. Department of Commerce.

prefabricated housing has increased notably.

While Japan is the largest U.S. export market, it has been down substantially since 1981 because of a slack economy and a housing recession. Consumption increased in 1986, due primarily to the yen gaining against the dollar. Also, that government has bowed somewhat to increasing U.S. pressure for reduced trade restrictions.

Lower tariffs on certain U.S. wood products will go into effect in April, adding over $20 million in annual trade. The biggest import increase will be in softwood and hardwood veneers.

Japan reduced tariffs on veneers, lumber, laminated products, moldings and panel products other than plywood for 1986 and 1987 as a result of ongoing MOSS (Market-oriented sector selective) negotiations. By the end of 1987, new and revised product standards are expected to give U.S. exporters easier access to the Japanese market.

Total U.S. wood products exports in the first nine months of 1986 amounted to $907.3 million, up 14% over $794.3 million for the same period in 1985. This included an increase in total hardwood exports of 57%, up from $30.1 million to $47.1 million and a 12% softwood export increase, up from $749.5 million to $840 million.

Specific quantity gains over 1985 for this nine-month period included: hardwood logs, up from 3,803,000 bd ft (8975 m^3) to 7,657,000 bd ft (18,070 m^3); hardwood lumber, from 30,948,000 bd ft (73,037 m^3) to 45,728,000 bd ft (107,918 m^3); softwood logs, from 1.405 billion bd ft (3.32 million m^3) to 1.488 billion bd ft (3.51 million m^3); softwood lumber, from 415,810,000 bd ft (981,311 m^3) to 554,587,000 bd ft (1.3 million m^3); softwood plywood, from 4,912,000 ft^2 to 6,649,000 ft^2; and softwood veneer, from 40,201,000 ft^2 to 72,559,000 ft^2.

Australia

Elsewhere in the Pacific Rim, U.S. softwood lumber exports to Australia were projected to be down notably in 1986 because of a slump in the housing industry. For the first three quarters the quantity was down versus 1985 from 131,250,000 bd ft (309,750 m^3) to 95,376,000 bd ft (225,087 m^3). In fact, total softwood exports for that period declined from $45.5 million to $31.1 million.

In 1985, total U.S. wood exports to Australia were almost $64 million. Of that, $55.3 million was softwood lumber sales, a volume of 375,000 m^3.

Australia is viewed as a steady and dependable lumber market with opportunities for increased penetration by western U.S. manufacturers in 1987.

Korea

Of Korea's $555 million wood products import market in 1985, $488 million was logs. Only $67 million was spent on processed products. And 58% of log imports were hardwood logs from Southeast Asia.

On a quantity basis, the U.S. supplied 62% of the softwood log market and 75% of the softwood lumber market in 1985. This amounted to 1.5 million m^3 of logs and 6000 m^3 of lumber. The country's total hardwood lumber imports totaled 134,000 m^3 and the U.S. share was 16%, or 22,000 m^3. Hardwood log imports totaled 3.3 million m^3 and the U.S. share was 1%.

Comparing the first nine months of 1985 with the same period of 1986, total U.S. softwood exports were up 57% on a value basis. The level rose from $75.5 million to $85.4 million. Specific product gains by quantity included: logs, up from 251,185,000 bd ft (592,796 m^3) to 283,595,000 bd ft (669,284 m^3) and lumber, up from 4,035,000 bd ft (9522 m^3) to 8,717,000 bd ft (20,572 m^3).

Hardwood exports increased from $6 million to $9 million. Notably, log exports increased from 2,450,000 bd ft (5782 m^3) to 4,291,000 bd ft (10,126 m^3) and veneer gained from 11,894,000 ft^2 to 23,837,000 ft^2.

Indications are that softwood is gradually gaining in some traditional hardwood markets such as furniture manufacturing because of cost factors.

Future market prospects look good for U.S. suppliers because many of Korea's traditional sources of tropical hardwood logs are banning exports.

Taiwan

Like Korea, Taiwan is a major exporter of tropical hardwood plywood. But it too is facing a permanent decline in log suppliers because of export bans in Indonesia and Malaysia. This is expected to increase markets for U.S. veneer and panels in the near future.

Currently, about 90% of U.S. exports are consumed by Taiwan's export industries, especially furniture and cabinet manufacturers. Structural products such as softwood plywood and framing lumber have little application for domestic construction. But export sources say trade in these items could be increased by $10 million annually if tar-

iffs were reduced or eliminated.

U.S. solid wood exports to Taiwan in 1985 totaled $72.6 million. Of this, hardwood products accounted for $59 million and softwood only $1.2 million.

Major U.S. export products included: 109,900 m^3 of hardwood lumber, 83,700 m^3 of hardwood logs, 22,500 m^3 of hardwood veneer, and 29,000 m^3 of particleboard. Softwood log and lumber exports totaled 6200 m^3 and 4900 m^3, respectively.

For the first three quarters of 1986, total U.S. exports totaled $94.7 million versus $51.8 million for the same period in 1985. Hardwood products gained substantially, from $42.8 million to $72.3 million. Notably, lumber exports increased from 32,218,000 bd ft (76,034 m^3) to 70,197,000 bd ft (165,665 m^3) and veneer from 51,839,000 ft^2 to 84,073,000 ft^2. The only notable softwood gain was in log exports, up from 1,357,000 bd ft (3202 m^3) to 4,712,000 bd ft (11,120 m^3).

High volumes of particleboard and MDF exported to Asia, especially Taiwan and Singapore, are consumed by the furniture industry and the finished products then imported back into the U.S. These low-cost wood furniture imports are an increasing problem for U.S. manufacturers. Imports rose 160% between 1980 and 1984, capturing a $1.2 billion market share.

People's Republic of China

China is expected to increase imports of U.S. wood products this year. Wood imports declined drastically in 1986 primarily due to low foreign exchange availability and high imports in 1985. However, China could become the largest importer of U.S. wood products within five years, according to a joint NFPA/FAS study completed in 1986.

China imported wood products valued at over $750 million in 1985. Of that total, $323.4 million was for softwood logs (4.8 million m^3) from the U.S. But only 39,700 m^3 of softwood lumber was shipped.

From 1981 through 1985, China's annual lumber imports increased from 63 million to 122 million bd ft, but the U.S. share slipped from 55% to 14%. Through aggressive marketing, Canada rapidly became the major supplier. Of approximately 300,000 m^3 imported in 1985, it had an 85% share.

Chinese construction is oriented to concrete frame and brick. Primary wood uses are for window and door components, concrete forming and scaffolding.

China imports only about 500,000 m^3 of softwood plywood annually, mostly from Indonesia. It isn't a primary construction material. Composite panels are promoted for use in the furniture industry as a means of woodwaste utilization.

To introduce timber-frame housing technology and to promote plywood, the American Plywood Assn. has participated in two demonstration house projects, one at Beijing and the other at Dalian.

As the country's foreign exchange reserves declined in 1986, most imports were through countertrade agreements. Overall U.S. exports were down 38% in the first seven months. But the U.S. is expected to regain a 52% share in 1987.

West Germany

U.S. solid wood exports to West Germany declined 23% from 1984 to 1985. The majority of solid wood exports in 1985 consisted of hardwood logs, veneer and plywood and softwood lumber. Softwood exports amounted to $15.8 million and hardwood exports $71.1 million.

Comparing the first three quarters of 1986 with the same period of 1985, total U.S. exports to West Germany increased 28% on a value basis, from $72.5 million to $92.7 million.

Quantity gains included: hardwood logs, up 20% from 18,737,000 bd ft (44,219 m^3) to 22,455,000 bd ft (52,994 m^3); hardwood lumber, up 14% from 16,465,000 bd ft (38,857 m^3) to 18,750,000 bd ft (44,250 m^3); hardwood veneer, up 63% from 180,482,000 ft^2 to 294,444,000 ft^2; softwood lumber, up 46% from 12,723,000 bd ft (30,026 m^3) to 18,603,000 bd ft (43,903 m^3); and softwood plywood up 94%, from 14,572 ft^2 to 28,257 ft^2.

Italy

U.S. exports to Italy declined in 1985 due to high interest rates, weak domestic demand and drastic fluctuations in that country's exchange rates. Still, it was the eighth largest U.S. export market, with shipments totaling $66.3 million. The predominant solid wood exports were softwood and hardwood lumber, totaling $42.6 and $10.2 million, respectively.

Furniture manufacturing accounts for some 70% of all wood products consumed in Italy. A general worldwide decline in demand for furniture in 1985 seriously depressed its overall wood products industry.

Compared with the first three quarters of 1985, the same period of 1986 saw a 27% improvement in total U.S. exports on a value basis. Exports were up from $49.5 million to $62.8 million.

Biggest product gains were: softwood lumber up 21%, from 132.8 million m^3 to 160.8 million m^3; hardwood lumber up 36%, from 23.9 million m^3 to 32.6 million m^3 and hardwood veneer up 63% from 17.1 million ft^2 to 27.9 million ft^2.

Netherlands

Although the Dutch economy improved in 1985, poor economic conditions have caused new home construction to decline notably since 1983. And as a result, there has been a concurrent drop in general wood products consumption. Home improvement construction is increasing, however.

U.S. solid wood exports were down 9% in 1985 over 1984. On a value basis, some 75% of U.S. sales was hardwood lumber (26,200 m^3) and softwood plywood (43,000 m^3). The U.S. was the primary supplier of plywood, followed closely by France. Other U.S. exports included: 4400 m^3 of hardwood logs; 10,700 m^3 of softwood lumber; 1100 m^3 of hardwood veneer; 600 m^3 of hardwood plywood; and 400 m^3 of particleboard.

For the first nine months in 1986, overall U.S. exports were up 64% over the same period of 1985, from $18.7 million to $30.7 million. Softwood imports more than doubled, up from $9.2 million to $18.6 million. The quantity of softwood lumber increased from 3,959,000 bd ft (9343 m^3) to 12,646,000 bd ft (29,844 m^3) and softwood plywood increased from 29,496 ft^2 to 64,883 ft^2.

United Kingdom

U.S. solid wood exports to the United Kingdom accounted for only about 4% of that country's total solid wood products imports in 1984 and declined 25% from that level in 1985. Most exports in 1985 were softwood lumber (63,900 m^3), softwood plywood (58,100 m^3) and hardwood lumber (42,400 m^3).

The overall trade decline in 1985 was due mostly to loss of market share by U.S. plywood manufacturers, primarily to Canadian competitors. This trend was reversed in 1986.

U.S. exports for the first three quarters of 1986 were up 57% compared to the same period of 1985, rising from $46.1 million to $72.4 million. Product gains included: hardwood lumber up from 13,046,000 bd ft (30,788 m^3) to 21,774,000 bd ft (51,386 m^3); hardwood plywood up 486,000 ft^2 to 8,005,000 ft^2; softwood lumber up from 20,894,000 bd ft (49,310 m^3) to 34,432,000 bd ft (81,260 m^3); softwood plywood up from 54,247,000 ft^2 to 83,941,000 ft^2; and softwood veneer up from 758,000 ft^2 to 2,240,000 ft^2. ■

FEBRUARY 1987

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FOREST INDUSTRIES

LOGGING/PULPWOOD/FORES[illegible]UMBER/PANELS

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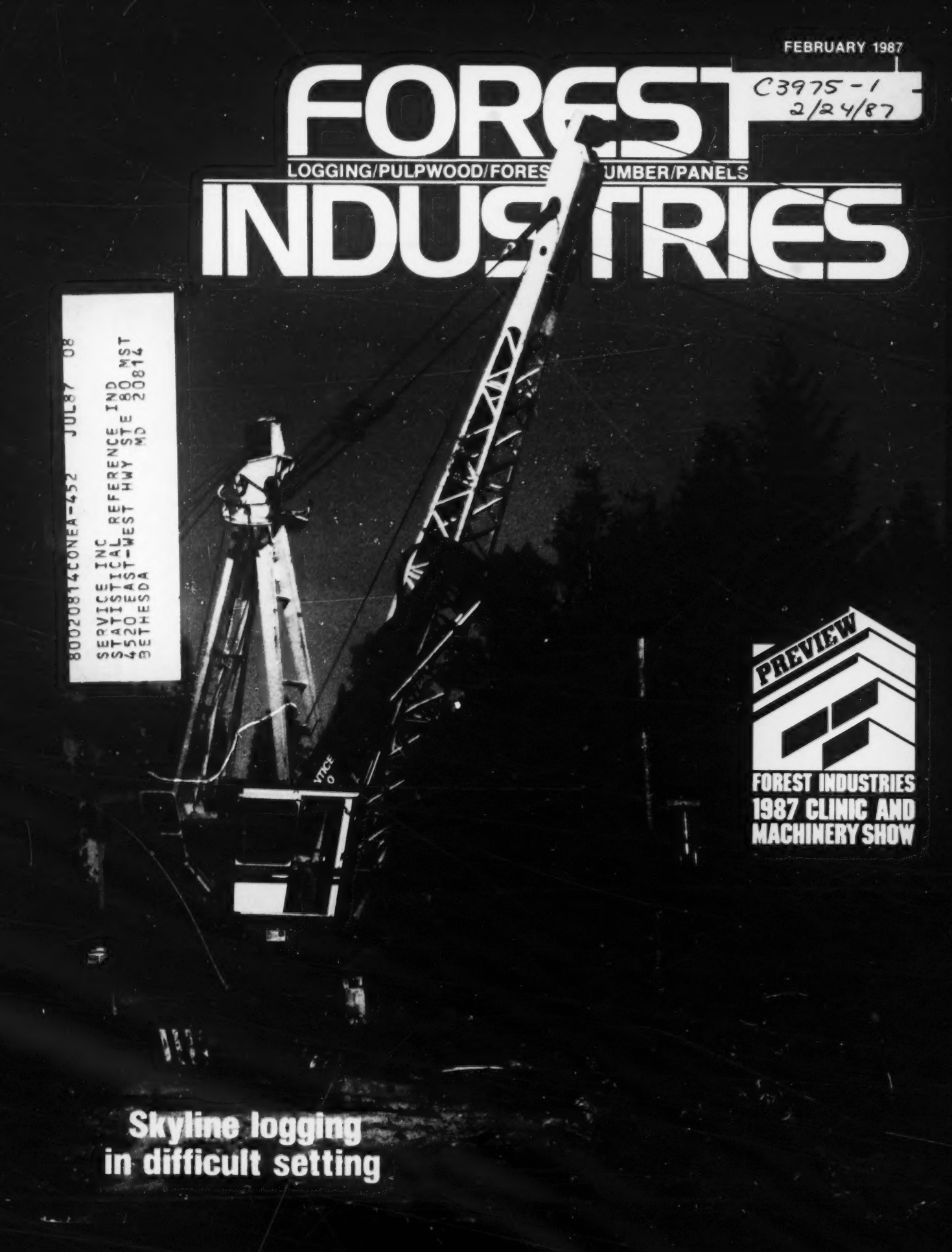
SERVICE INC
STATISTICAL REFERENCE IND
4520 EAST-WEST HWY STE 80 MST
BETHESDA MD 20814



PREVIEW

FOREST INDUSTRIES 1987 CLINIC AND MACHINERY SHOW

Skyline logging in difficult setting

1987 Volume 114 Number 2

FEBRUARY

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Loggers are becoming an 'endangered species,' says veteran Oregon logger
In more than 30 years of pulling timber out of the woods, Dale Johns, Azalea, Ore., has encountered all sorts of problems. Insurance woes are the latest crisis he has to face

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Flexible crews ensure consistent high volume
Glenn Thompson, Chester, S.C., works under the theory of wearing out machinery rather than trading, but extended warranty programs may change that, he says

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Premium logs increase value of yield gains
Computerized carriage at Beasley Lumber Co., a small specialty products sawmill in Scotland Neck, N.C., provides surprising gains

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The 15th annual FOREST INDUSTRIES Clinic & Machinery Show will feature nine workshops and more than 250 exhibitors. See complete details inside

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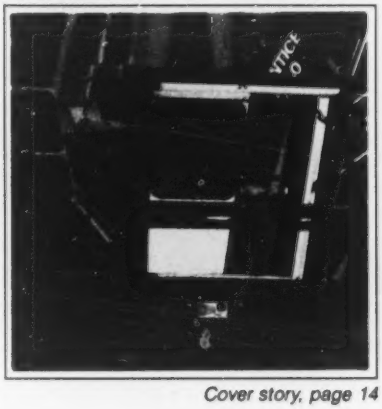

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FI's capital spending survey figures again dominated by new board plants, but reflect increased confidence of lumber and plywood segments; new vitality in West

Spending patterns shift as dollar totals increase

Reported capital spending projects, North American solid-wood industry, 1986-88, by product and start-up year (millions of US$)

	1986	1987	1988+	Total
UNITED STATES				
Lumber	**39.6**	**62.3**	**87.7**	**189.5**
New mills	11.0	22.4	37.0	70.4
Modernization	28.6	39.9	50.7	119.1
Plywood and veneer	**20.7**	**22.9**	**22.8**	**66.5**
New mills	—	14.0	—	14.0
Modernization	20.7	8.9	22.8	52.5
Waferboard/OSB	**180.0**	**160.0**	**150.0**	**490.0**
New mills	150.0	160.0	150.0	460.0
Modernization	30.0	—	—	30.0
Particleboard	**5.5**	**55.0**	**60.0**	**120.5**
New mills	—	40.0	60.0	100.0
Modernization	5.5	15.0	—	20.5
MDF	**50.0**	**55.0**	**50.0**	**155.0**
New mills	30.0	40.0	50.0	120.0
Modernization	20.0	15.0	—	35.0
Energy	**—**	**75.0**	**100.0**	**175.0**
Other	**17.8**	**—**	**—**	**17.8**
TOTAL U.S.	**313.5**	**430.2**	**470.5**	**1214.3**
CANADA (in US$)				
Lumber	**31.4**	**77.7**	**6.6**	**115.7**
New mills	—	54.0	—	54.0
Modernization	31.4	23.7	6.6	61.7
Waferboard/OSB	**36.5**	**51.2**	**35.8**	**123.4**
New mills	36.5	50.1	35.8	122.3
Modernization	—	1.1	—	1.1
Particleboard	**2.2**	**—**	**—**	**2.2**
Modernization	2.2	—	—	2.2
MDF	**29.2**	**28.5**	**—**	**57.7**
New mills	29.2	28.5	—	57.7
Other	**1.8**	**10.0**	**—**	**11.8**
TOTAL CANADA	**101.1**	**167.4**	**42.3**	**310.8**
TOTAL NORTH AMERICA	**414.6**	**597.6**	**512.9**	**1525.1**

NOTE: Totals may not agree due to rounding.

San Francisco, California

Like a dazed fighter shaking away the cobwebs after an eight count, the North American forest products industry has assembled the pieces of a comeback effort in an extended post-recovery period that has seen overcapacity, depressed prices, uncertain raw material strategies, the prolonged Canadian softwood lumber import controversy and strikes interfere with the orderly planning of capital spending strategies.

Our second annual capital spending survey reflects the increased confidence of the industry, documenting projects over a three-year period valued at an estimated $1.525 billion. This survey covers 1986, 1987 and 1988.

Last year, the survey for a comparable period, 1985 through 1987, indicated projects valued at $1.029 billion. Granted that two overlapping three-year periods do not lend themselves to a scientific comparison, but as a general barometer of the industry's progress that's a 48.2% jump.

The tables summarize 182 projects by industry segment, year of scheduled completion, state, province, region and country. Canadian dollar figures in all cases were converted to U.S. dollar amounts at the rate of 0.73:1. (Interesting to note the stability between the two currencies: that was the same factor we used last year. Both came from current issues of *The Wall Street Journal.)*

Companies are a trifle more willing to commit a year or so ahead than was the case a year ago. Last year's survey showed 50% of the total in the year just past, 38.2% in the current year and 11.7% in the year to come. This year's survey total was distributed 27.2% in the year just past, 39.2% in the current year and 33.6% in 1988. (Projects extending beyond 1988 were included in that year's totals.)

The actual dollar amounts for 1986 and 1987 were also greater in this year's survey: $414.6 million and $597.6 million, respectively, versus $393.5 million and $120.8 million in last year's report.

Most capital spending activity in the

reconstituted wood panel industry is centered on new plants, while the lumber and plywood industries are currently undergoing a surge of mill remodeling projects.

Board plants, new and modernized, accounted for 62% of the estimated survey value. Sawmill projects accounted for 20%, plywood for 4.4% and the "other" category—boosted by the high price tags on wood-fueled energy plants—for 13.4%.

Most sawmill and plywood modernization projects are aimed at improving productivity and product recovery. This augurs well for suppliers of scanning and optimizing equipment as well as headrigs, carriages, edgers, trimmers and sorters—all mentioned prominently among survey responses.

Among plywood producers, X-Y chargers, lathe rebuilds, power nosebars and core drives, shortened and synchronized tray systems, rotary clippers and veneer stacking systems were indicated frequently.

The survey includes seven new sawmills, one new veneer plant, 15 new OSB and/or waferboard plants, two new particleboard plants and five new MDF plants. Also indicated are 98 sawmill, 32 plywood and nine board plant remodeling projects.

The "other" column includes projects as diverse as a pole mill, treating plants, panel surface laminating lines and wood-fueled electric energy plants.

One major change since last year's survey is a shift in regional emphasis in the U.S. The South still leads but it has a smaller slice of the pie. Percentages of the U.S. dollar total by region in last year's survey were: South, 62.8%; West, 21.8%; North Central/Midwest, 8.8%; and Northeast, 7.6%.

This year's survey shows the effect of the many West Coast sawmill and plywood plant remodeling projects: South, 46.1%; West, 35.1%; North Central/Midwest, 4.6%; and Northeast, 14.2%.

Methodology was the same as it was last year. Questionnaires were sent in original and follow-up mailings, and to these responses were added projects indicated in news reports which we have published since the last survey. Also included were United States and Canadian panel plants verified by a supplier survey which is an annual feature of WORLD WOOD, our international journal.

A number of the responses were exceptionally detailed and candid. These represented a mixture of large and small companies alike, and we would like to thank all who responded for their help. Certainly there are other public corporations who will reveal no more than the Securities and Exchange Commission requires, and they are represented in this survey through the channels indicated in the preceding paragraph.

Where dollar amounts were not divulged, we entered our own estimates based on similar projects. This was necessary in only 14% of the cases, however—a far better record than was the case last year. The full list of projects contained in the survey database will be contained in the initial volume of the FOREST INDUSTRIES FACTBOOK, to be published later this year. ■

—Dave Pease

Reported capital spending projects, North American solid-wood industry, 1986-88, by state/province and region (millions of US$)

	Lumber	Plywood	Board	Other	Total
Alabama	9.6	—	50.0	0.1	59.7
Arkansas	6.4	7.2	15.0	—	28.7
Florida	0.9	—	—	—	0.9
Georgia	2.9	0.8	40.0	—	43.7
Kentucky	1.0	—	—	—	1.0
Louisiana	1.1	3.3	43.0	—	47.4
Maryland	—	—	—	2.5	2.5
Mississippi	3.3	0.5	—	—	3.8
N. Carolina	5.2	—	110.0	—	115.2
S. Carolina	—	7.6	—	—	7.6
Tennessee	3.0	—	—	—	3.0
Texas	30.4	11.0	110.0	—	151.4
Virginia	—	—	95.0	—	95.0
SOUTH	**64.0**	**30.4**	**463.0**	**2.6**	**560.0**
California	21.3	—	—	100.0	121.3
Idaho	54.4	—	—	—	54.4
Montana	2.0	12.4	40.0	—	54.4
New Mexico	6.0	—	—	—	6.0
Oregon	29.5	7.9	72.5	15.0	124.9
Washington	9.4	15.3	40.0	—	64.7
Wyoming	0.4	—	—	—	0.4
WEST COAST	**123.0**	**35.6**	**152.5**	**115.0**	**426.1**
Illinois	—	0.5	—	0.2	0.7
Michigan	—	—	40.0	—	40.0
Minnesota	—	—	15.0	—	15.0
N. CENTRAL	**—**	**0.5**	**55.0**	**0.2**	**55.7**
Maine	2.5	—	15.0	50.0	67.5
New Hampshire	—	—	—	25.0	25.0
New York	—	—	20.0	—	20.0
Pennsylvania	—	—	60.0	—	60.0
NORTHEAST	**2.5**	**—**	**95.0**	**75.0**	**172.5**
TOTAL U.S.	**189.5**	**66.5**	**765.5**	**192.8**	**1214.3**
Alberta	—	—	94.9	—	94.9
B.C.	98.9	—	20.9	10.0	129.7
W. CANADA	**98.9**	**—**	**115.8**	**10.0**	**224.8**
N.B.	0.1	—	—	—	0.1
Ontario	6.1	—	—	1.8	8.0
Quebec	10.6	—	67.5	—	78.1
E. CANADA	**16.8**	**—**	**67.5**	**1.8**	**86.2**
TOTAL CANADA	**115.7**	**—**	**183.3**	**11.8**	**310.8**
NORTH AMERICA	**305.2**	**66.5**	**948.8**	**204.6**	**1525.1**

NOTE: Totals may not agree due to rounding.

MARCH 1987

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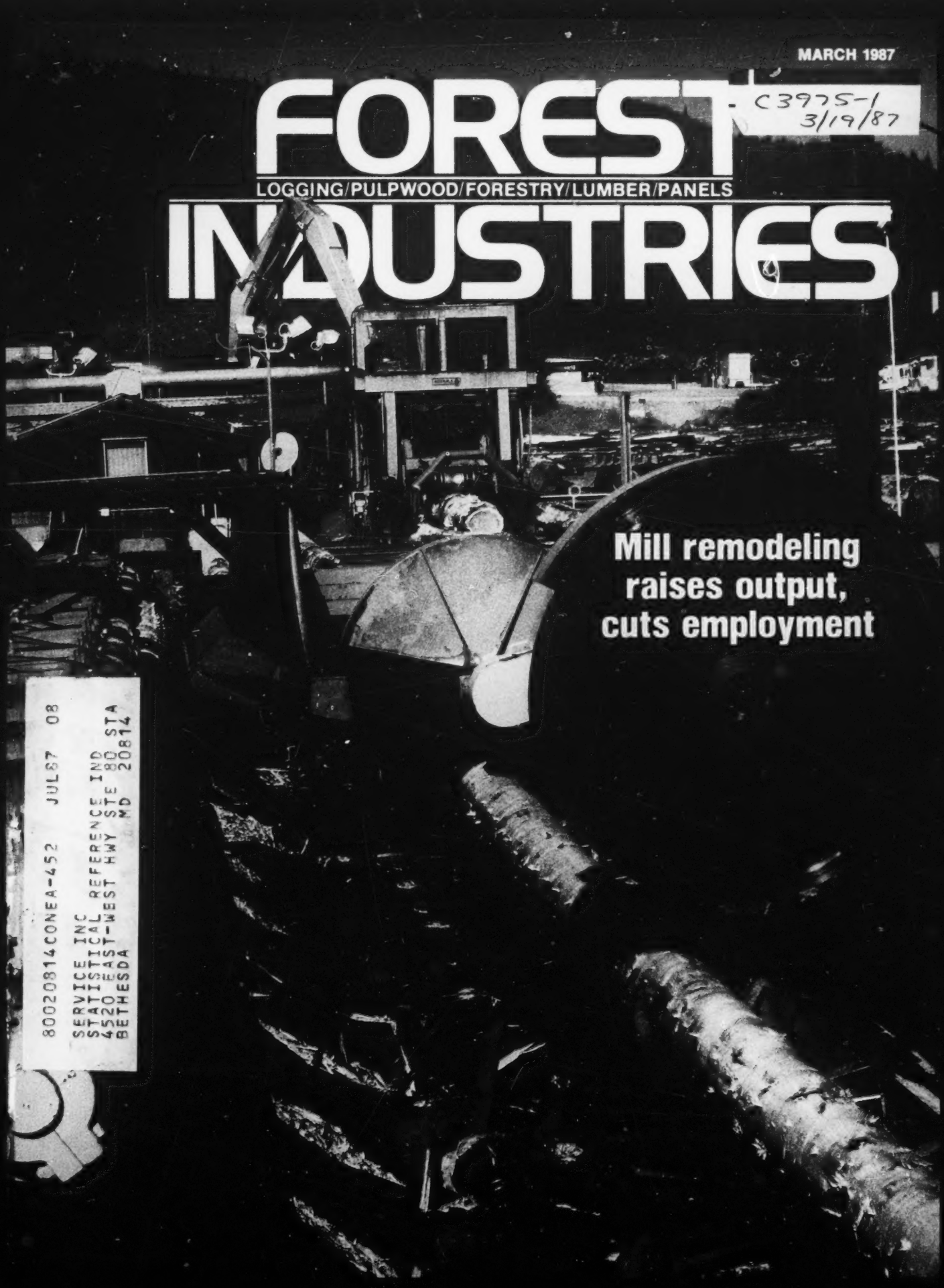
FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS



Mill remodeling raises output, cuts employment

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SERVICE INC
STATISTICAL REFERENCE IND
4520 EAST-WEST HWY STE 80 STA
BETHESDA MD 20814

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Intensive training program gets credit for fast startup
'Less is more' for Simpson Timber Co.'s Korbel, Calif., mill: $12-million second phase of remodeling raises recovery rate and cuts employment in the mill

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New technology keeps aging mill profitable
As part of integrated forest products operation, Temple-Eastex's Diboll, Texas, sawmill fills dual role. Upgrading projects have almost doubled

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Wood loss per sawline: how machines compare
Wood loss per sawline is an important consideration in operating mills for maximum recovery. Here machines are compared to determine such loss

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Fluid power and control of mill machinery
As fluid power becomes increasingly responsible for critical mill machinery functions and performance, durable hydraulic systems are mandatory

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Mechanized thinning crew requires precision landing
Robert Wiedman's small crew in Walkerville, Mich., was created to thin red pine stands. It contrasts sharply with his hardwood chipping crew

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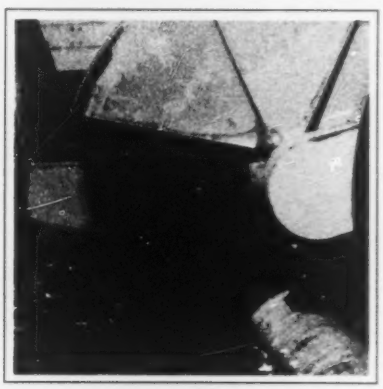
What's ahead for Canada's lumber and panel industries
A report from Widman Management Ltd. indicates that from 1987-90 Canada's forest industry won't enjoy the strong market conditions of 1986



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Greater output planned for Lewiston operations

LEWISTON, IDAHO—Update from Potlatch Corp.: the Lewiston sawmill, undergoing a $35-million modernization, will be shut down temporarily in the spring to phase in the new project.

Startup on a one-shift basis will occur later in the year, but plans call for three-shift operation by the first quarter of 1988. Earlier, Potlatch had scheduled two shifts daily for the remodeled mill.

The rebuild involves the complete production process starting with the log yard, said western wood products division vice president James R. Morris.

Along with the sawmill reopening, Potlatch will start up an idle plywood plant at Lewiston on one shift daily, increasing to two shifts early in 1988.

By the end of the year, Potlatch will close permanently its 70-year-old Rutledge sawmill in Coeur d'Alene, Idaho. Employees willing to move will be given hiring preference at Lewiston.

One other item of capital project news this month: Domtar Inc. of Montreal will modernize and expand its insulation board plant at Donnaconna, Que., increasing capacity by 25%. Completion of the C$3-million project is scheduled for September 1987. ■

Friendly takeover sees Stone absorb Southwest

PHOENIX, ARIZ.—April closing is expected for the acquisition of Southwest Forest Industries, based here, by Stone Container Corp. of Chicago. A definitive agreement was executed Jan. 27.

Value of SFI stock to be acquired was placed at about $442 million. Stone will also assume SFI obligations which include long-term debt of $264 million.

Stone is a major producer of containerboard and corrugated boxes. The SFI purchase will mark Stone's entry into newsprint, market pulp and solid-wood products manufacture.

This prospect brings into question the future of SFI's solid-wood business. Seven sawmills produced 321.7 million bd ft in 1985 and two softwood plywood plants have combined annual capacity of 300 million ft². SFI also owns some 334,000 acres of fee timberland in the South, among other assets.

SFI's operations will be consolidated into those of Stone. SFI CEO William A. Franke will leave the company.

U.S. forest industry results, 1986 ($ millions)

Company	4th quarter				Full year			
	Sales	% chg	Earngs[1]	% chg	Sales	% chg	Earngs[1]	% chg
Boise Cascade	969.3	8.8	31.9	68.2	3780.5	1.4	101.5	-2.9
Champion Intl.	1058.0	-11.4	64.5	69.4	4387.6	-24.0	200.8	23.1
Chesapeake	149.9	22.7	7.1	183.1	599.8	33.4	13.7	-12.5
Federal Paper Board	307.2	18.3	13.7[2]	140.6	948.6	21.0	33.5[2]	199.5
Georgia-Pacific	1781.0	12.0	83.0[3]	51.5	7223.0	7.5	265.0[3]	57.4
Great Northern Nekoosa	535.0	11.0	37.0	250.0	2040.0	5.2	35.3	84.6
Intl. Paper	1900.0	72.7	113.0[4]	156.6	5500.0	22.2	305.0[4]	129.3
IP Timberlands	38.0	-19.0	20.0	-23.0	171.2	26.0[5]	98.0	51.0[5]
James River (10/26)	1160.4	72.0	55.5[6]	85.0	—	—	—	—
Jefferson Smurfit	240.8	59.6	9.6	171.4	944.4	48.1	28.0	66.4
Louisiana-Pacific	382.2	22.3	16.8[7]	212.4	1506.2	19.5	64.9	154.5
Pope & Talbot	71.5	-6.2	8.5	n.m.	289.1	-10.0	15.8	137.9
Potlatch Corp.	243.3	7.0	23.1	360.8	978.4	2.7	69.9	85.7
Scott Paper	986.4	19.3	52.9	6.7	3437.0	12.7	186.6[8]	-7.2
Southwest Forest	169.9	21.3	5.1[9]	189.3	631.5	8.5	7.2[9]	n.m.
Union Camp	534.9	18.1	42.9	109.4	2045.2	9.6	129.9	36.6
Westvaco (10/31)	498.7	13.7	43.2	20.8	1811.9	5.2	106.1	3.3
Weyerhaeuser	1450.6	17.7	96.1	51.1	5852.0	8.6	270.0	60.3
Willamette Inds.	317.9	16.5	26.4	94.8	1290.2	4.2	74.7	23.9

[1] Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years.

[2] Federal Paper Board: Quarter and year excludes $15.1-million charge for early redemption of notes.

Georgia-Pacific: Fourth quarter and year include $33-million gain from sale of certain stock and warrants. Year net excludes $17-million gain from change in accounting for pensions and cumulative effect of new timber capitalization program. 1985 quarter and year net exclude $10-million gain from court settlement. 1985 year excludes $30-million loss from discontinued operations. 1985 net excludes $19-million gain from sale of timberlands.

International Paper: 1986 quarter net includes $11-million gain from change in pension accounting. Year and quarter include $19-million net gain relating to sale of headquarters building. Full year net also includes these pretax items: $39-million gain on offerings of depositary units of IP Timberlands Ltd.; $44-million gain from change in pension accounting; $20-million loss from rise in income taxes. 1985 net includes $56-million gain on IP Timberlands offering; $12-million loss from discontinued operations; $29-million charge for early retirement program.

IP Timberlands: Operations began March 14, 1986.

James River: Excludes a $18.4-million charge due to impact of Tax Reform Act.

Louisiana-Pacific: Fourth-quarter net excludes gain of $183 million related to sale of timberland to U.S. government. 1985 year net excludes $66.4-million gain to change in accounting method for investment tax credit.

Scott Paper: 1986 net includes $35-million pretax loss from effects of new tax law and nine-week strike at Mobile, Ala., mill.

Southwest Forest Industries: Year net excludes $10.395-million charge related to the conversion of debentures.

n.m. — Not meaningful.

In other ownership news:

• Fletcher Challenge Ltd., based in New Zealand, has purchased 47% of British Columbia Forest Products Ltd., Vancouver, B.C., for about C$507 million. Fletcher bought nearly 20.4 million common shares from Gordon Investment Corp. and Merrill Lynch Canada Ltd., plus 6.3 million treasury common shares from BCFP, at C$19 per share. The two investment firms bought the shares in May 1986 at C$12.25.

Fletcher Challenge has said it will not attempt to buy more than a 49% interest in BCFP. Fletcher owns 82% of Crown Forest Industries in B.C. and interests in New Zealand and Chile.

• Owens-Illinois Inc., after turning down earlier purchase offers, accepted $60.50 per share, or $3.64 billion, in February from Kohlberg Kravits Roberts & Co. KKR is expected to sell some assets to reduce debt resulting from the leveraged buyout. No specifics on the forest products division, which O-I considered selling before the buyout; however, Louisiana-Pacific earlier was said to have purchased O-I's Jasper, Texas, southern pine plywood plant.

• Balco Industries Ltd., Kamloops, B.C., was courted by two corporate suitors—Slocan Forest Products Ltd. and Timber Investments Ltd.—in January. The nod went to the latter, a privately held company which owns a sawmill,

(Continued on p. 14)

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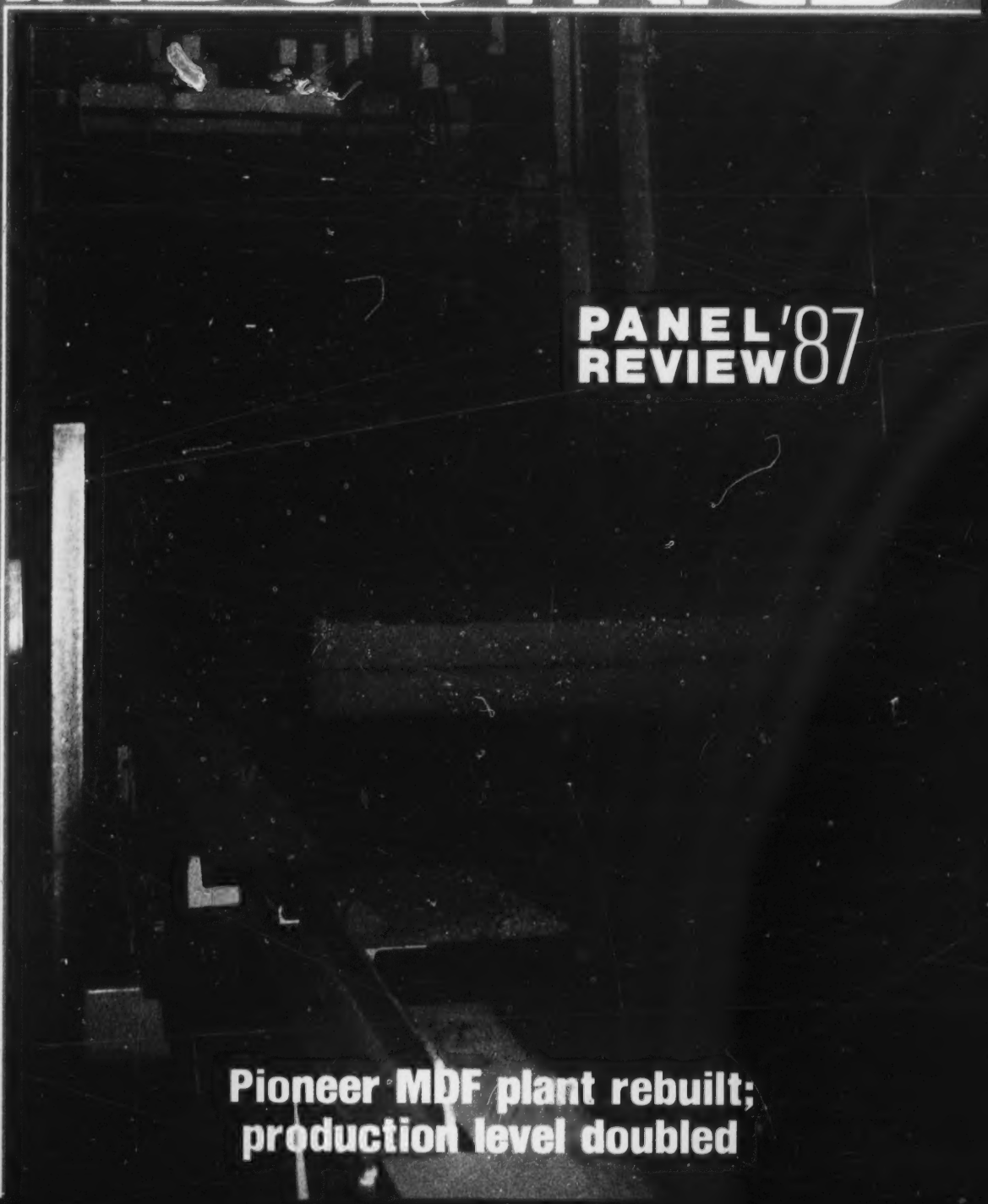
FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS



PANEL REVIEW '87

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Pioneer MDF plant rebuilt; production level doubled

1987 Volume 114 Number 4

APRIL

Panel Review

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Pioneer MDF plant rebuilt; production level doubled
Newly formed MDF Technology Inc. has overcome numerous engineering obstacles to revive a 21-year-old MDF plant in Deposit, N.Y. Production is rapidly approaching design capacity

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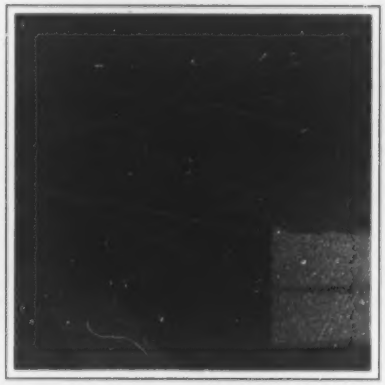

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Structural panel output pushed over the top in fourth consecutive year, thanks to strength in both plywood and non-veneer markets. MDF reaches new high; industrial board paces particleboard gains

Records fall within U.S. panel industry

San Francisco, California

Strong demand pulled output of structural panels and medium-density fiberboard in the United States to record levels in 1986, and raised particleboard production as well. In the panel industry, only hardboard continued a declining trend.

Structural panels consist of softwood plywood, oriented strand board and waferboard. American Plywood Assn. estimates place 1986 production at 25.4 billion ft^2 (⅜-in. basis), an 11.2% jump from the 1985 record of 22.8 billion ft^2.

National Particleboard Assn. has estimated 1986 MDF production at 755 million ft^2 (¾-in. basis). This is a 10.3% gain over the 1985 production level of 684.6 million ft^2; another record.

Last year's particleboard production increased to an estimated 3.5 billion ft^2 (¾-in. basis), gaining 5.1% on 1985 output of 3.3 billion ft^2, according to the NPA. The record year for particleboard was 1978, when production reached 3.7 billion ft^2.

Hardboard output has slipped yearly since 1983, when production of 7.3 billion ft^2 (⅛-in. basis) was recorded. The 1986 level was reported at 5.8 billion ft^2 by the American Hardboard Assn., a drop of 7.6% from the previous year's figure of 6.3 billion ft^2. The record year for hardboard was also 1978, when production reached 7.8 billion ft^2.

Canadian panel production volumes last year did not stray far from the previous year's levels. Softwood plywood was depressed by a lengthy strike in British Columbia; waferboard and particleboard were up a fraction; and hardboard was off. Details are contained in the sidebar on the opposite page.

Structural panels

Of the 25.4 billion ft^2 (⅜-in. basis) structural panel production total last year, softwood plywood accounted for 22.1 billion ft^2 and non-veneer panels for 3.3 billion ft^2, the American Plywood Assn. estimated. This represents a 10% gain for plywood and a 24% increase for OSB and waferboard, measured against record 1985 levels. APA expects final numbers late in April.

Structural panel production is expected to grow to 26.4 billion ft^2 by 1991, according to APA's Marketing Group, following a dip in the late 1980s. This will represent 84.6% of the industry's capacity. Production will remain centered in the South (46.4%), although gains will be recorded in all regions.

By 1991, 32 waferboard and OSB plants should be on line in the United States, registering capacity of 5.3 billion ft^2 and production of 4.6 billion ft^2. Production will represent 15% of the total structural panel capacity.

U.S. structural panel producers have aggressively pursued market diversification to minimize dependence on the cyclical home building industry. Only 9.4 billion ft^2, or 38%, of production went into home building last year, despite home building strength indicated by 1.8 million housing starts, APA president William T. Robison noted.

By contrast, 1978 saw 47% of structural panel output move into the housing market. Total production was 19.9 billion ft^2.

APA is forecasting 1.7 million housing starts this year and has expressed confidence that further gains in non-housing markets will keep production at the 25 billion ft^2 level.

International markets represent an extremely bright spot on APA's marketing horizon. Offshore shipments in 1986

U.S. Panel Production, 1976-1986

(thousand ft^2)

Year	Structural panels (⅜-in. basis)	Particleboard (¾-in. basis)	Hardboard (⅛-in. basis)	MDF (¾-in. basis)
1976	18,440,000	3,202,225	7,066,022	280,036
1977	19,376,000	3,592,910	7,200,000	441,354
1978	19,964,000	3,720,369	7,800,000	508,416
1979	19,653,000	3,376,488	7,687,798	506,728
1980	16,468,000	2,949,897	6,140,000	493,140
1981	17,023,000	2,869,352	6,104,000	516,102
1982	16,402,554	2,393,066	5,586,918	446,157
1983	20,821,342	2,919,544	7,302,702	605,098
1984	21,967,917	3,195,586	6,837,118	634,974
1985	22,838,170	3,330,517	6,300,146	684,593
1986	25,400,000*	3,500,000*	5,822,328	755,000*

** Estimated.*

totaled 595.6 million ft², or 526,000 m³, a leap of 85.8% above the 1985 volume, and the association has identified the international sector as the market area capable of the most dramatic expansion over the next 25 years. Shipments exceeding 4 million ft² are achievable by 2010, Robison said.

Particleboard and MDF

Combined particleboard and MDF production in 1986 totaled over 4.2 billion ft² (¾-in. basis), equaling the previous record set in 1978, observed Rich Margosian, general manager of the National Particleboard Assn.

Last year also saw positive progress in resolving the issue of formaldehyde emissions from particleboard and MDF, Margosian noted.

Nearly all the 5.1% production gain in particleboard last year was represented by industrial panels, while mobile home decking and underlayment shipments were virtually the same as in 1985. Last year was the fourth consecutive annual period of MDF growth since the industry began recovering from the 1982 slump, when shipments totaled 2.8 billion ft².

Particleboard shipments in 1986 represented nearly 90% of industry capacity, Margosian reported, while MDF production represented 77% of U.S. capacity at the end of the year.

Particleboard capacity was reduced by 102 million ft² in 1986 due to closure of the Kirby Forest Industries plant in Silsbee, Texas. Capacity will increase in 1987 with new lines at Weyerhaeuser Co., Moncure, N.C., 90 million ft²; Louisiana-Pacific Corp., Missoula, Mont., 50 million ft²; and Masonite Corp., Stuart, Va., 45 million ft².

NPA estimated particleboard capacity as of Jan. 1, 1987 at 3.9 billion ft² and projects the level to increase almost 5% to 4.1 billion ft² by Dec. 31, 1987.

The MDF industry added to annual production capacity during 1986 and will do so again in 1987, Margosian noted. Last year saw production come on line at Louisiana-Pacific Corp., Newberry, Mich., 50 million ft², and MDF Technology Inc., Deposit, N.Y., 55 million ft² (see story, p. 13).

In 1987, new production is scheduled for Louisiana-Pacific Corp. at Eufaula, Ala., and Urania, La., each 50 million ft², and Willamette Industries, Malvern, Ark., 58 million ft². These additions will push U.S. MDF capacity above 1.1 billion ft² by the end of 1987, according to NPA projections.

Some important milestones were reached in 1986 concerning the formaldehyde issue, Margosian pointed out:

- Two Voluntary Industry Standards covering formaldehyde emissions were approved by industry. NPA 8-86, approved in January by companies representing over 90% of the industry, defines maximum emission levels for particleboard, following the 1985 HUD rule emission levels of 0.3 ppm at a loading ratio of 0.13 ft²/ft³ and 0.5 air changes per hour. October brought industry approval of a Voluntary Formaldehyde Emission Standard for MDF which limits emissions to 0.3 ppm at a loading ratio of 0.08 ft²/ft³. This ratio represents about twice the maximum amount of MDF which would be used in a home.
- In October, the Consumer Product Safety Commission denied a Consumer Federation of America petition requesting development of stringent mandatory formaldehyde regulations. CPSC cited industry efforts to reduce emissions and pointed to studies indicating use of the new low-emission products should keep indoor ambient levels below 0.1 ppm.

Factbook available in August

While gathering data for this year's panel review, FOREST INDUSTRIES editors conducted a mill-by-mill survey of North American panel plants. Updated production and/or capacity figures were collected from several hundred mills.

These statistics will be included in the *1987-88 North American Factbook*, an all-new reference due off press in August. The Factbook will include a wide range of information about lumber and panel producers in the U.S. and Canada, including current production figures, capital spending data, and listings of where products are sold.

For more information, contact Corinne Shulman, Editorial Projects Coordinator, FOREST INDUSTRIES, 500 Howard St., San Francisco, Calif. 94105. Tel. (415) 397-1881. ■

Strike depressed 1986 Canadian plywood output

VANCOUVER, B.C.—In terms of growth, 1986 was not a banner year for the wood-based panel industries in Canada. Softwood plywood production in British Columbia declined 4%, due largely to the lengthy strike which shut down several major mills. In softwood plywood, as goes B.C., so goes Canada.

Waferboard and particleboard registered production gains, and hardboard slipped against 1985 levels. Statistics Canada reported the following 1986 figures (1985 production in parentheses):

- Softwood plywood shipments were 1,887,557 m³; production was 1,876,896 m³ (1,957,887 m³); production was down 4.1%.
- Waferboard/OSB shipments were 1,355,587 m³; production 1,347,638 m³ (1,336,566 m³); production up 0.8%.
- Particleboard shipments 1,115,095 m³; production 1,139,253 m³ (1,047,500 m³); production up 8.8%.
- Hardboard shipments 135,650 m³; production confidential (155,929 m³).

The Council of Forest Industries of British Columbia calculated 1986 B.C. softwood plywood production at 1.733 billion ft² (⅜-in. basis), versus 1.855 billion ft² in 1985.

Coastal mills bore the brunt of the strike-related production cut with a 14% drop in Douglas fir production. Canadian Softwood Plywood (CSP) production was up 3%, reflecting the increased capacity of mills in the Interior.

A new plywood mill at Fort Nelson came on stream in 1986 and capacity increases in other plants through modernization expanded the B.C. industry by 150 million ft², according to COFI.

The domestic market for softwood plywood was buoyant during 1986 with the strong housing demand helping to maintain higher price levels. But this produced a negative effect on export shipments, particularly sanded grades.

Art Kempthorne, COFI's plywood sector manager, estimated that 1987 production will run 5% to 10% higher than in 1986. He also expects export volumes will be restored to a point close to 1985 levels now that the effects of the lengthy strike are dissipated.

"There are definite signs of recovery in the United Kingdom timber frame housing market," he said. "This should assist in the recovery of our exports to that country. We have finally made a long-awaited breakthrough in the Italian concrete form market and Italy was our third largest export market in 1986. Japan is continuing to show a steady demand for export packaging and China presents a major opportunity."

In the area of reconstituted panels, Canada expanded its MDF capacity in 1986 by 50 million ft²/yr (¾-in. basis) with completion of the Blue Ridge Lumber Co. mill in Whitecourt, Alta., the National Particleboard Assn. indicated. Panfibre in Mont Laurier, Que., will add another 61 million ft² when it begins production late this year. ■

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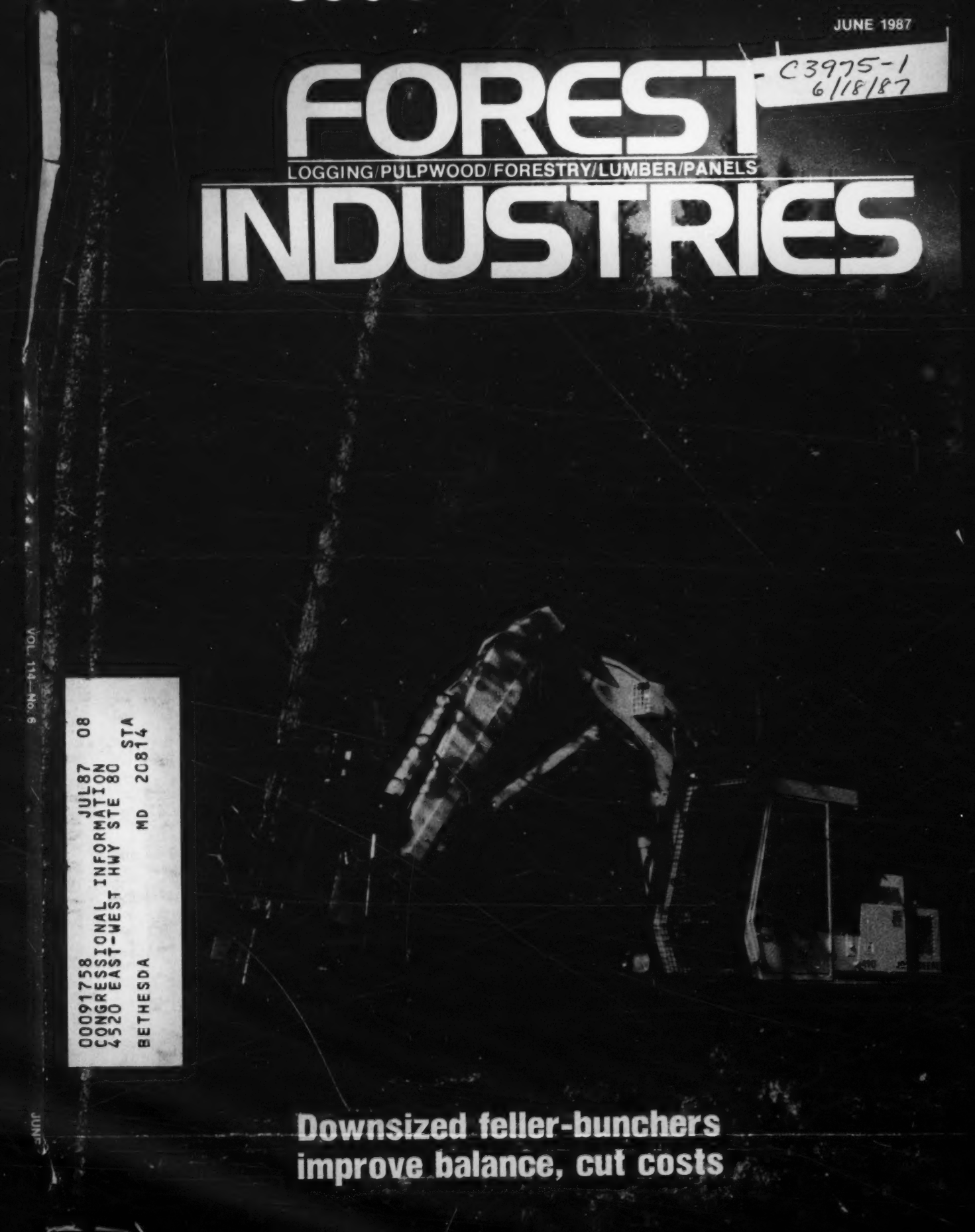

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VOL 114—No. 6

Downsized feller-bunchers improve balance, cut costs

JUNE

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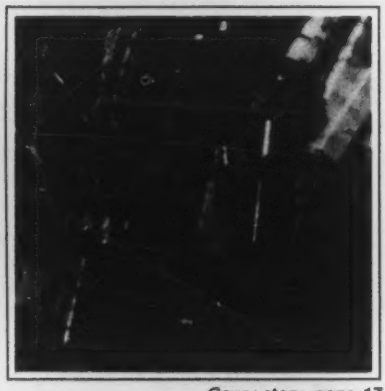
Conversion to hardwood gives new life to studmill
When Mount St. Helens exploded in 1980, it blew away softwood timber Exeter Lumber, Longview, Wash., depended on. Now mill saws hardwood



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Canadian export bill scheduled for passage

VANCOUVER, B.C.—One major obstacle in the road leading to an amicable trans-border relationship on the matter of softwood lumber shipments to the United States from Canada appeared on the verge of removal in May.

Legislation mandating the 15% export tax agreed upon at the end of December by negotiators was scheduled for final reading before the House of Commons the week of May 18. Enactment was predicted to follow promptly.

The Canadian Senate had already reviewed the bill and returned it to the House of Commons.

Controversy did not end with the agreement to impose the tariff, it merely took another form. There have been mixed reports about interim collection during the limbo period between agreement and legislation, and criticism has been levied at the United States for not dealing uniformly with exemptions.

From Canada came the argument that wrinkles should be ironed out of the agreement before passage of legislation, while the U.S. position was that no new negotiations should be undertaken until obligations contained in the December agreement are fulfilled.

It should be noted that several major British Columbia firms have made an example of paying the tax prior to action by Parliament. In April, National Forest Products Assn. reported 83% compliance.

The U.S. Coalition for Fair Lumber Imports, wondering if the agreement might have been written in disappearing ink, issued a resolution late in April calling for the U.S. government to "do everything possible to ensure that Canada promptly lives up to its obligations."

Failure to pass enabling legislation means Canada has not collected the tax, the coalition's resolution asserts.

"Instead, it has sought and obtained voluntary contributions of substantial, but diminishing, amounts. Collections are less than they would have been had the Canadian legislature acted."

The number of Canadian firms filing lumber tax returns in February declined more than 15% from January, the coalition claimed.

Meanwhile, federal and provincial officials in Canada will probably confer into the summer or fall on specifics of replacing the 15% tax with formulas assuring higher stumpage prices. ■

U.S. forest industry results first quarter 1987 ($ millions)

Company	Sales	% change 1987/86	Earnings[1]	% change 1987/86
Bohemia Inc. (1/31)	53,000	20.0	700	—
Boise Cascade	912,220	0.36	40,150	80.6
Champion International	1,097,223	-2.24	55,466	152.1
Chesapeake Corp.	155,460	16.3	4,232	—
Federal Paper Board	229,804	10.6	10,934	353.1
Georgia-Pacific	1,855,000	15.6	80,000[2]	166.6
Great Northern Nekoosa	566,700	16.2	43,300	211.5
International Paper	1,800,000	63.6	90,000[2]	260.0
Louisiana-Pacific	422,900	31.1	16,310	1,099.3
Pope & Talbot	100,303	36.4	6,651	1,338.0
Potlatch Corp.	248,628	6.6	17,786	30.4
Scott Paper	967,400	19.5	49,000	25.3
Southwest Forest Industries	170,400	19.6	6,700	255.8
Temple-Inland	390,600	33.4	33,700[2]	147.8
Trus Joist	48,000	47.0	1,600	40.0
Union Camp	537,018	8.5	44,197	100.5
Westvaco (1/31)	440,860	5.9	19,496	-3.8
Weyerhaeuser	1,617,343	23.8	101,917	103.9
Willamette Industries	322,980	18.7	22,947	203.3
WTD Industries (1/31)	41,000	102.0	800	—

[1] Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years.
[2] Georgia-Pacific: 1987 earnings include $6-million pretax gain from stock redemption. International Paper: 1987 earnings include pretax gain of $14 million from sales of securities. 1987 figures include Hammermill Paper Co. Temple-Inland: 1986 quarter includes $4.3-million gain on property and equipment.

Quarterly earnings soar vs. same period in 1986

SAN FRANCISCO, CALIF.—First quarter 1987 was good to most forest products corporations, as improved markets and the results of cost reduction programs joined to improve earnings much greater proportionately than sales totals.

Comparison of first-quarter figures this year and last obscures the fact that, for many companies, business was flat or slightly down versus the final quarter of 1986.

For some integrated companies, paper and related divisions kicked quarterly earnings sharply upstairs. In other cases, solid-wood products carried their share of good news.

• Georgia-Pacific Corp. net income in the first quarter jumped 167% from the comparable 1986 period, while sales increased 16%. Net income for the corporation and its building products group set first-quarter records.

• Louisiana-Pacific Corp. first-quarter sales were the highest in the company's history, up 31% from the same period in 1986. Earnings leaped over 1000% from levels recorded in the first quarter of 1986.

• Potlatch Corp. earnings and sales for the quarter rose 30% and 7% respectively. Wood products group earnings of $6.3 million eclipsed first quarter 1986 earnings of $0.9 million.

• Temple-Inland Inc. earnings have increased for four consecutive quarters, with net income 148% over the first quarter of 1986.

• Champion International Corp. attributed its 152% earnings improvement to "generally better market conditions, a sharp increase in wood products earnings, and continuing productivity improvements." Sales were off 2%.

• Boise Cascade Corp. net income jumped 61% versus the first quarter of 1986, while sales increased only a fraction of one percent. While income from the building products segment almost tripled the results of the same quarter a year ago, figures were down slightly from fourth quarter 1986.

• Union Camp Corp. quarterly earnings doubled over the same period a year ago, against a sales increase of 8.5%. Strong demand for paper-related products received much of the credit. ■

A survey of costs of southern forest management focused on the costs associated with selected forestry practices, and how they are changing

Management cost changes for southern forests

By Thomas J. Straka and William F. Watson

Mississippi State, Mississippi

Current and future costs of forest management practices in the South are essential information for forest managers and planners responsible for capital allocation decisions.

In all businesses it is important to understand the types and sizes of the costs involved. Forestry is no exception. Forest products companies maintain detailed records on costs and revenues to assist managers in making decisions on forestry projects.

However, comparable information is usually not available to nonindustrial private forest landowners or potential forestry investors. Also, forest managers need reliable cost information when considering alternative forest practices where cost records are not available.

The primary source of cost data on forestry practices in the southern United States has been *Forest Farmer.* Beginning with a 1952 forest practices cost survey, *Forest Farmer* has periodically published surveys of cost trends. Researchers at southern universities collected this cost data by surveying individuals, private firms, and public agencies across the southern U.S.

The 1984 survey was designed to provide additional information on factors that influence the cost of forestry practices, especially planting, site preparation, chemical application, and fertilizer application. The 1984 questionnaire was sent to 250 individuals. A total of 110 questionnaires was returned. Responses were well distributed over the 13 southern states. As individuals could report on more than one treatment for each practice, there were as many as 160 observations for some of the practices.

Cost analysis

Site preparation: Respondents reported on 35 mechanical site preparation treatments. Treatments ranged from a simple chop-and-burn to multipass mechanical treatments such as shear-rake-pile-bed. It is apparent that individuals are selecting the most suitable treatment for their situation. No longer are standard site preparation treatments used throughout the South. With this much variety in treatments, there was insufficient data available to develop in-depth analyses of the individual treatments.

TABLE 1—Est. cost, site prep treatments, 1984

# of passes by machines for treatment	Cost ($) of treatment/acre
1	58.42
2	90.55
3	122.68
4	154.81

We classified site preparation treatments by the number of passes across the tract by machines performing the treatment. This permitted us to develop an equation to predict the total cost of the treatment as a function of number of passes.

The equation is as follows: Cost of Treatment Per Acre = 58.42 + 32.13 (Number of Passes - 1).

The R^2 for this equation is 45.8%. The predicted cost of a treatment based on the number of passes is given in Table 1. The difference in the coefficients for this model was not statistically significant when separate equations were developed for the three geographic regions of the South. A variable defined as the average size of tract treated was also tested in this model, but was not found to be significant.

Planting costs: Respondents classified planting costs according to planting conditions and methods. For example, planting was classified as hand or machine planted, if planted on clearcut or old field, and by type of site preparation treatment carried out before planting.

Again, there was great diversity in the types of site preparation treatments used. Thus, site preparation was classified as being intensive mechanical prep-

TABLE 2—Distribution of planting data by planting conditions and methods, 1984

	% total observations	
Old fields		
Hand planted	7.4	
Machine planted	3.7	
Total old fields		11.1
After clearcutting		
Intensive mechanical site prep		
Hand planted	28.8	
Machine planted	41.1	
Total intensive mechanical site prep		69.9
Non-intensive mechanical site prep		
Hand planted	5.5	
Machine planted	13.5	
Total non-intensive mechanical site prep		19.0

aration or less intensive nonmechanical preparation. The average size of the tract also was reported.

The data revealed few trends in the cost of planting. Most of the planting reported (89%) was carried out following clearcutting operations (see Table 2). The average cost of planting old field sites and clearcuts following both intensive mechanical site preparation and non-intensive mechanical site preparation is presented in Table 3.

In none of these situations did the cost of hand planting significantly differ from the cost of machine planting. As the costs were highly variable, no significant cost differences were detected. No significant differences in the cost of planting by geographic regions were detected. Further, there were no significant trends detected in the cost of planting as tract size was varied.

Thus, one must conclude that the cost of planting is so variable in the South that any trends that might exist are masked by the variability of the data. The variability is attributed to the appropriate selection of site preparation and planting strategy by land managers for their situation. Intensive wood utilization during logging and/or a costly site preparation treatment should result in a less expensive planting method.

Conversely, a site preparation treatment which does not remove debris from the site usually requires more costly planting methods. This survey did not ask for information on the site conditions prior to planting and, thus, could not detect these relationships.

Herbicide application: Three general methods of applying herbicides were reported in the survey. These methods were aerial, ground application using a mobile carrier, and ground applications with a portable applicator. The portable applicators included backpack sprayers and injectors. The costs, including the herbicide costs, for each method of herbicide application are shown in Table 4.

The cost of aerial application was significantly higher than the cost of applying the herbicide with a portable applicator. The costs of applying herbicides with a mobile ground unit were so variable that they were not significantly different from the cost of application with an aerial or portable unit. Again, the variation in these costs by geographic region was not found to be significant.

Fertilization: Respondents applied fertilizers aerially or with ground mobile units. The costs of application, including the cost of fertilizer, are reported in Table 5. There is no significant difference in the cost of application between the two methods of application, nor was there a significant difference in costs among the geographic regions. Likewise, the size of the tract was not significant in predicting the cost of applying the fertilizer.

TABLE 3—Cost of planting, 1984

Type of site	Average cost ($)	Minimum cost ($)	Maximum cost ($)
Old fields			
Hand	52.10	24.48	81.00
Machine	36.49	18.00	57.50
Cutover sites			
Intensive mechanical site prepared			
Hand	36.45	23.00	75.80
Machine	31.99	13.13	81.00
Non-intensive mechanical site prepared			
Hand	41.58	22.00	85.00
Machine	30.02	27.00	61.00

TABLE 4—Cost* of herbicide application, 1984

Method	Average cost*/acre ($)	Minimum cost*/acre ($)	Maximum cost*/acre ($)
Aerial	74.64	30.00	113.25
Ground (mobile)	78.42	36.00	133.38
Ground (portable applicator)	55.14	16.00	117.50

** Includes the cost of the herbicide.*

TABLE 5—Cost* of fertilizer applications, 1984

Method	Average cost*/acre ($)	Minimum cost*/acre ($)	Maximum cost*/acre ($)
Aerial	39.81	27.50	65.59
Ground (mobile)	37.94	25.00	60.00

** Includes the cost of fertilizer.*

Forest practices cost trends

Two types of cost trends can be identified for forest practices cost trends: a general rise in the cost of these practices, and a shift between the components that make up these trends (i.e., direct labor, supervision, equipment and overhead). Over the last three decades the cost of forestry practices have increased dramatically, slightly outpacing increases in the producer price index. Part of the explanation for these increases is the change in the relative importance of the cost components contributing to the trends.

All seven forestry practices experienced significant price increases from 1961 to 1984 (Table 6). With the exception of hand planting, the greatest cost increases occurred in labor-intensive practices. Table 6 also shows these cost trends relative to price trends for 1967 to 1984. The year 1967 is currently the base year for the producer price index data. These changes are related to the general price level at wholesale, and to southern pine lumber prices.

The indexes provide a basis for comparing the costs of selected forestry practices with both forest products prices and with general economic trends. Southern pine lumber prices were used instead of stumpage prices because the lumber price index is more broadly based and may give a more reliable picture of price trends.

In comparing the costs of selected forestry practices with the price indexes, five of the seven major forestry practices experienced cost increases greater than the increase in the producer price index. The practices with the highest indexes (removing undesirable trees with an index of 637, timber marking with 473, and prescribed burning with 448) are well over the producer price index of 310. The indexes for four forestry practices exceeded the southern pine lumber price index of 320. This may be a partial

explanation for the trend among many forest products companies toward shifting to less intensive forest management practices.

Component cost trends

Component costs have been recorded since the 1961 survey. Component cost trends for seven important forestry practices for the period 1961-1984 are shown in Table 7.

Prescribed burning is labor-intensive. It had the greatest annual percentage increase in cost of the seven practices from 1961-1984 and one of the largest increases in percentage of direct labor cost. Prescribed burning and mechanical site preparation have the two highest combined labor and equipment components of the seven practices.

Supervision costs, as a percentage of total costs, have generally declined. Only the cost of injecting undesirable trees shows an increase in the supervision component. Overhead component cost increased for all seven practices. Shifts between costs of labor and equipment can be traced to the rising cost of energy. In the early surveys, increasing labor cost was the most significant component cost. In the 1976 survey, escalating equipment and energy costs contributed most to escalating total costs. Labor costs continue to push up the total cost of practices.

In addition to equipment/energy and labor, another factor which contributes to the increased cost of site preparation and planting is the general movement from easily treated areas into the more difficult areas.

Discussion

The failure of regional differences and tract size to be significant in explaining the variation in these costs is surprising. This means that the variation in the costs of the various practices is so diverse within a region that regional differences are not discernible.

As was pointed out earlier, this can be explained partially by the fact that land managers are putting together a package of practices appropriate for their holdings. The package for one tract in a region may include more intensive site preparation but less expensive planting methods. Other tracts might include greater utilization, low-cost site preparation treatment, and high-cost planting. Another possibility is that production technology is not being developed rapidly enough for low-cost substitutions to be implemented.

The relationship between tract size and the cost of the practice might be accounted for by dependence on contractors to perform these activities. The contractors usually are fully employed during the period in which they can perform the treatment; thus, there is no need to grant price concessions for larger tracts. In fact, low-cost planting contractors often are passed up for contractors practicing better quality control.

The actual cost of performing the various practices could be better understood with a study designed to account for the factors affecting the cost. Such a study would reveal the costs of these activities to the vendor or contractor performing the services.

However, this study is still enlightening since data on prices paid for the performance of these practices are given. The most significant finding of this study is that the prices paid for the performance of forest practices are highly variable across the South as well as in geographic regions of the South.

Component cost differences do exist between the various forestry practices. Shifts between 1961-1984 can be explained by changing technological and economic conditions. Many practice costs increased faster than the producer price index. Generally, labor and equipment (including energy) components accounted for the greatest increases. ■

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TABLE 6—Current dollar costs of selected forestry practices in the South for 1961 and 1984, and percent annual change*

Forestry practice	Current dollar cost per acre or seedling		Annual change (%)	Cost or price index (1967=100)
	1961	1984	1961-1984	1984
Prescribed burning	0.68	7.16	10.8	448
Hand planting	0.0163	0.0485	4.9	213
Machine planting	0.0120	0.0505	6.4	318
Mechanical site prep	14.09	90.23	8.4	384
Timber cruising	0.41	2.26	7.7	305
Timber marking	2.10	14.63	8.8	473
Injection of undesirable trees	7.93	64.82	9.6	637
Producer price index, all commodities				310
Producer price index, southern pine lumber				320

** All costs are on a per acres basis, except planting, which is on a per day seedling basis.*

TABLE 7—Component cost percentages of selected forestry practices in the South for 1961 and 1984

Cost component	Prescribed burning		Hand planting		Machine planting		Mechanical site preparation		Timber cruising		Timber marking		Injection of undesirable trees (not including chemical cost)	
	1961	1984	1961	1984	1961	1984	1961	1984	1961	1984	1961	1984	1961	1984
Direct labor	39.4	49.7	69.1	56.1	42.8	32.6	19.6	19.3	51.0	70.4	62.0	61.4	68.4	65.5
Equipment	32.8	30.3	5.8	13.0	34.9	35.3	65.4	63.1	9.5	6.7	13.4	10.8	15.1	6.6
Supervision	18.1	10.2	13.4	9.7	10.7	10.5	7.4	4.3	27.4	9.9	14.8	5.7	8.2	12.6
Overhead	9.7	9.8	11.7	21.2	11.6	21.6	7.6	13.3	12.1	13.0	9.8	22.1	8.3	15.3

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LOGGING PULPWOOD FORESTRY LUMBER PANELS

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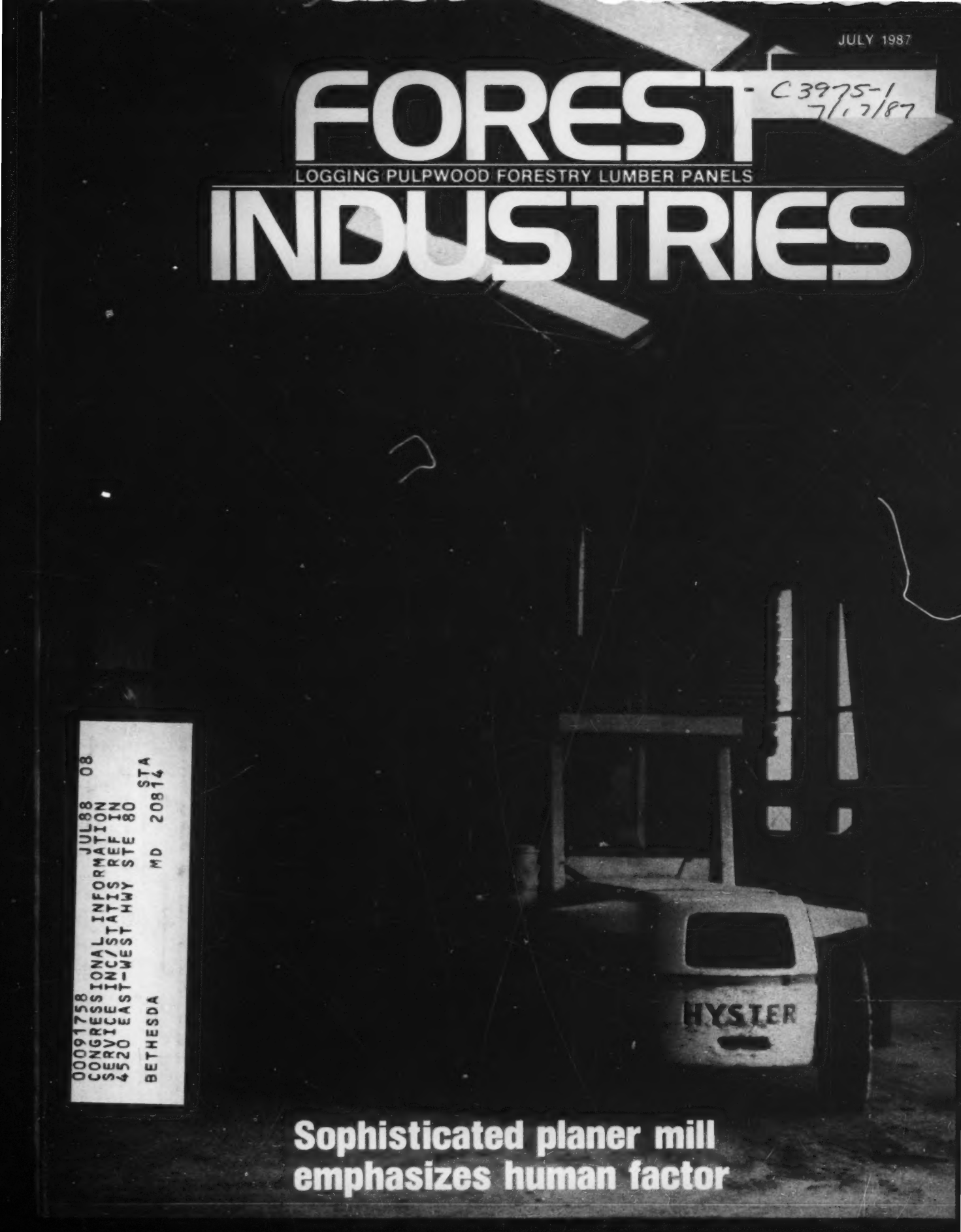

Sophisticated planer mill emphasizes human factor

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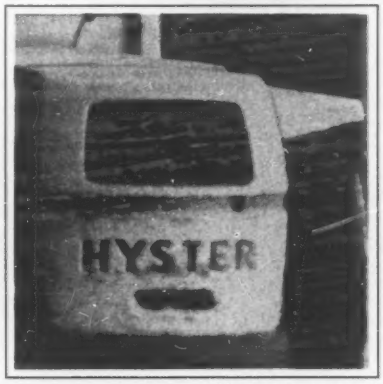

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In 1986 U.S. lumber producers had a very good year, and Canadian producers had a better year than expected. Analysts predict the strong performance will continue

North American lumber output hits new high

San Francisco, California

If it's true that figures don't lie, then lumber manufacturers had very little to complain about in 1986. A look at last year's lumber production and consumption figures indicates that the North American lumber industry is firmly back on solid ground.

The year was marked by high U.S. and Canadian housing starts, record lumber demand, increased prices and strong offshore markets.

North American lumber production set new records. Combined U.S. and Canadian output in 1986 stood at 64.2 billion bd ft, a 6.6% increase over 1985's level of 60.2 billion bd ft.

Record year for the U.S.

Figures from the U.S. alone are even more impressive. According to the National Forest Products Assn. (NFPA), total U.S. lumber production in 1986 was 41.7 billion bd ft, up 11% from 1985's level of 37.4 billion bd ft (see Table 1). Softwood lumber production in the U.S. reached a record 34.7 billion bd ft, up nearly 11% from 1985. Nearly all softwood-producing regions reported record levels.

Hardwood production climbed to just under 7 billion bd ft, up 15% from 1985's level of 6 billion bd ft.

Lumber consumption hit new highs in 1986. Total consumption of 53.8 billion bd ft was up 7% from 1985's level of 50 billion bd ft.

Softwood consumption set a record for the third consecutive year. Softwood consumption of 46.8 billion bd ft was up nearly 6% from 1985's level of 44.2 billion bd ft. According to Western Wood Products Assn. president H. A. Roberts, increased residential construction, which used 37% of all softwood lumber in 1986, and expanding repair and remodeling activity, which accounted for 28% of consumption, were the reasons for increased softwood consumption.

And in the hardwood sector, consumption soared in 1986. Hardwood consumption reached 7 billion bd ft, a 20% jump from 1985's level of 5.8 billion bd ft. "Due to the generally strong U.S. economy, our hardwood market is better than it's been in years," noted S. C. "Bill" White, executive manager of the National Hardwood Lumber Assn. "Our mills simply can't keep up with demand."

Canada hit, but not badly

Meanwhile, the Canadian lumber industry also had a good year, despite setbacks from a prolonged strike by the International Woodworkers of America (IWA) and uncertainty during much of the year surrounding a possible tax on Canadian softwood lumber exports to the U.S. (On Dec. 30 the governments of Canada and the U.S. agreed on a 15% export tax to be levied by Canada. The action forestalled imposition of a countervailing duty by the U.S. government. For an update on the story, see p. 5.)

The 4½-month IWA strike by two-thirds of British Columbia's woodworkers lowered production levels at many mills, but it turned out to be less harmful than anticipated. According to the B.C. Council of Forest Industries, the dispute between the IWA and the forest products companies had surprisingly little impact on harvesting levels and lumber production.

Lumber production in British Columbia in 1986 was 13.3 billion bd ft (see Table 2). Even though it was down 5% from 1985's figure of 14 billion bd ft, it was the second highest total in the province's history.

Total Canadian production was 22.5 billion bd ft, down only 1% from 1985's record level of 22.8 billion bd ft.

Outlooks mostly positive

According to a study by Widman Management, Vancouver, B.C., production of Canadian lumber should dip in

TABLE 1—United States Lumber Production

	Softwood Lumber Production, By Regions						
Year	Southern Pine	Douglas Fir	Western Pine	California Redwood	Other	Total Softwood Production	Total Softwood Consumption
1977	8.879	8.796	10.309	2.000	1.753	31.737	40.809
1978	9.231	8.845	10.033	1.902	2.046	32.057	42.640
1979	9.283	8.427	9.780	1.818	2.124	31.432	40.608
1980	8.217	6.815	7.613	1.589	2.012	26.246	33.832
1981	8.415	6.270	7.147	1.452	1.392	24.676	32.064
1982	8.754	5.743	6.681	1.300	1.309	23.787	31.173
1983	10.181	7.934	8.488	1.580	1.543	29.726	39.742
1984	10.674	8.329	8.992	1.664	1.515	31.174	42.857
1985	10.730	8.062	9.276	1.730	1.523	31.321	44.243
1986	11.605	9.008	10.487	1.938	1.687	34.725	46.811

Figures in recent years subject to revision. Numbers may not add to totals due to rounding.

1987 before rebounding in 1988.

The report, "Canada's Forest Industry Market '87-90" (see FOREST INDUSTRIES March 1987, pp. 34-36), forecasts a drop in production to 21.4 billion bd ft in 1987, and then a climb to 22.2 billion bd ft in 1988 and 23.6 billion bd ft in 1990.

Although Widman forecasts net Canadian softwood lumber production levels to drop by only 600 million bd ft between 1986 and 1987 (from 22 billion to 21.4 billion bd ft), the impact of the Canadian export tax on softwood lumber will have the effect of taking approximately two billion bd ft off the market, the report predicts.

Canada shipped 14 billion bd ft of lumber to the U.S. in 1986. Canadian imports accounted for 30% of U.S. consumption in 1986, down from 32.8% in 1985.

In the United States, analysts are forecasting another good year for the timber industry in 1987. Although some economists are concerned that homebuilding activity may be inhibited by rising mortgage interest rates, most projections are for only a slight drop from last year's 1.8 million housing starts.

The National Assn. of Homebuilders' most recent forecast is for 1.6 million starts in 1987; the Western Wood Products Assn. predicts 1.75 million units.

Increased exports also are contributing to U.S. wood products industry optimism. Softwood lumber exports increased from 1.5 billion bd ft in 1985 to 1.86 billion bd ft in 1986, a rise of 24%. Increases were registered in 16 of the top 20 U.S. markets for softwood lumber.

Hardwood lumber exports were way up, climbing 34% from 373 million bd ft in 1985 to 498 million bd ft in 1986.

Offshore markets for both hardwood and softwood lumber are expected to stay strong throughout 1987.

TABLE 2—Canadian Lumber Production Softwood and Hardwood, 1977-1986 (billion bd ft)

Year	B.C. Coast	B.C. Interior	Total B.C.	East of Rockies	Total Canada
1977	4.499	7.539	12.038	5.629	17.667
1978	4.803	7.742	12.545	6.432	18.977
1979	4.657	7.861	12.518	6.480	18.998
1980	4.252	7.727	11.980	6.923	18.903
1981	3.456	6.966	10.424	6.473	16.897
1982	3.170	6.939	10.109	5.887	15.996
1983	4.140	8.903	13.043	7.328	20.371
1984	3.903	9.175	13.078	8.056	21.134
1985	3.996	10.007	14.003	8.822	22.825
1986	3.753	9.582	13.335	9.211	22.546

Source: Statistics Canada

FI's annual survey

Gathering production figures from the leading lumber producers in the U.S. and Canada is an annual event for the FOREST INDUSTRIES editorial staff. This year, for the first time, the survey was conducted in cooperation with the National Forest Products Assn. (NFPA).

Our first questionnaire was sent in March to more than 1500 lumber producers in the U.S. and Canada; a second questionnaire was sent a few weeks later to non-respondents. For big producers (defined as companies producing 10 million bd ft or more annually) that did not answer either mailing, staff from FI and NFPA made phone calls to gather the data.

To date we have gathered production figures from over 650 companies. Space does not allow us to publish all the data here. A complete listing will be included in the *1987-88 North American Factbook*, a new reference book published by FOREST INDUSTRIES. The book goes to press later this month and will be available in August. (For details, see p. 6.)

Top 20 producers

Table 3 shows the top 20 North American lumber producers. Eleven are from the U.S., nine are from Canada.

The top 20 producers manufactured 19.6 billion bd ft of lumber in 1986, or 31% of North American production.

In the U.S., the leading 11 producers manufactured 12.5 billion bd ft, or 30% of total U.S. lumber production. That figure includes 12.1 billion bd ft of softwood, 35% of the nation's total, and 382 million bd ft of hardwood, or 5.5% of the total.

In Canada, the top nine producers manufactured 7 billion bd ft of lumber in 1986, accounting for 31% of Canada's total production.

Notes on the leaders

There are no surprises in this year's top 10. What is worth noting, however, is that the long-time number one producer, Weyerhaeuser Co., no longer leads by such a wide margin. As recently as 1984, Louisiana-Pacific trailed Weyerhaeuser by nearly a billion bd ft. But in 1986 Weyerhaeuser produced

and Consumption, 1977-1986 (billion bd ft)

Hardwood Lumber Production, By Regions			Total Hardwood Production	Total Hardwood Consumption	Total Lumber Production	Total Lumber Consumption
Southern	Appalachian	Other				
3.073	1.211	2.417	6.701	6.890	38.438	47.699
3.258	1.233	2.540	7.031	6.997	39.088	49.637
3.462	1.263	2.589	7.314	6.939	38.746	47.547
3.341	1.221	2.553	7.115	6.272	33.381	40.104
3.374	1.237	1.641	6.252	5.855	30.928	37.919
2.061	0.602	2.398	5.062	5.098	28.849	36.270
2.245	0.785	2.614	5.644	5.397	35.370	45.138
2.642	0.985	2.635	6.262	5.836	37.436	48.693
2.628	0.904	2.500	6.031	5.834	37.352	50.077
2.664	1.408	2.883	6.955	7.013	41.680	53.824

Source: National Forest Products Assn.

TABLE 3—Top 20 lumber producers, U.S. and Canada

(All lumber production figures given in 1000 bd ft)
(Companies ranked according to data received by FOREST INDUSTRIES and NFPA)

Company, headquarters, & number of mills in 1986	Rank in 1985	'86 Hardwood	'86 Softwood	'86 Total	'85 Total
1. Weyerhaeuser Co. (31 mills) Tacoma, Wash.	1	141,000	2,412,000	2,553,000	2,609,000
2. Louisiana-Pacific Corp. (58) Portland, Ore.	2	22,000	2,507,000	2,529,000	1,997,000
3. Georgia-Pacific Corp. (37) Atlanta, Ga.	3	179,139	1,604,535	1,783,674	1,884,000
4. West Fraser Mills Ltd. (6) Quesnel, B.C.	6	0	1,086,688	1,086,688	1,047,892
5. Canadian Forest Products Ltd. (13) Vancouver, B.C.	4	0	1,046,600	1,046,600	1,301,600
6. Champion International Corp. (14) Stamford, Conn.	8	0	1,028,378	1,028,378	941,270
7. International Paper Co. (12) Dallas, Texas	11	0	999,065	999,065	883,817
8. British Columbia Forest Products Ltd. (9) Vancouver, B.C.	5	0	980,858	980,858	1,197,990
9. Weldwood of Canada Ltd. (7) Vancouver, B.C.	9	0	868,000	868,000	912,000
10. Boise Cascade Corp. (18) Boise, Idaho	10	23,000	821,000	844,000	806,000
11. MacMillan Bloedel Ltd. (9) Vancouver, B.C.	7	0	830,000	830,000	950,000
12. Sierra Pacific Industries (8) Redding, Calif.	13	0	722,148	722,148	626,286
13. Westar Timber Ltd. (5) Vancouver, B.C.	12	0	639,820	639,820	660,796
14. Whonnock Industries Ltd. (7) Vancouver, B.C.	16	0	600,000	600,000	510,000
15. WTD Industries Inc. (9) Portland, Ore.	31	17,155	532,015	549,170	329,213
16. Balfour Forest Products Inc. (5) Prince George, B.C.	18	0	528,000	528,000	490,000
17. Doman Industries Ltd. (5) Duncan, B.C.	19	0	527,000	527,000	476,000
18. Roseburg Forest Products Co. (3) Roseburg, Ore.	22	0	520,000	520,000	450,000
19. Simpson Timber Co. (6) Shelton, Wash.	17	0	510,000	510,000	498,625
20. RSG Forest Products Inc. (4) Kalama, Wash.	35	0	474,637	474,637	304,631

only 24 million bd ft more than Louisiana-Pacific. And L-P's December 1986 acquisition of Kirby Forest Industries Inc. means that L-P has increased its lumber capacity by more than 100 million bd ft.

Production figures from number four producer, West Fraser Mills Ltd., include the company's wholly owned mills as well as two mills which are owned by Eurocan Pulp and Paper Co. Eurocan is a joint venture of West Fraser and Enso Forest Products Ltd.

Champion International Corp. figures do not include production of Weldwood of Canada Ltd., in which Champion holds a 72% interest. However, figures from Weldwood (number nine on our list) include production from its five wholly owned mills, plus two joint ventures (Babine Forest Products Co. and Houston Forest Products Co.).

International Paper Co., number seven this year, includes in its production nearly 200 million bd ft from Hammermill Paper Co.'s two softwood lumber mills. Hammermill was purchased by IP in mid-1986. At the time of the purchase Hammermill had seven hardwood mills and two softwood mills. Six of its hardwood mills have since been sold.

This year there are two new entries to the top 20 producers: WTD Industries, of Portland, Ore., and RSG Forest Products Inc., of Kalama, Wash. The two companies are among the fastest growing lumber producers in North America.

WTD was ranked 73rd in our 1983 Annual Lumber Review, 55th in 1984, 31st in 1985 and now 15th in 1986. A string of purchases in 1987 (including some announced just this month—see p. 7) indicates the company intends to keep climbing up the list.

RSG Forest Products Inc. jumped from 35th place in our 1985 survey to number 20 in this year's listing. The company was ranked 39th in 1983 and 37th in 1984. RSG also is expected to continue to climb the list; it acquired four Smurfit Newsprint (formerly Publishers Paper) sawmills at Molalla and Oregon City, Ore., in late 1986.

Roseburg Forest Products Co., Roseburg, Ore., reentered the top 20 producers in 1986. Roseburg was ranked 19th in 1983, 21st in 1984, 22nd in '85 and 18th in 1986. The company also has grown recently. Late in 1986 it acquired the Paul Bunyan Lumber Co. sawmill in Anderson, Calif., which adds 45 million bd ft of capacity to Roseburg. ■

SEPTEMBER 1987

C3975-1
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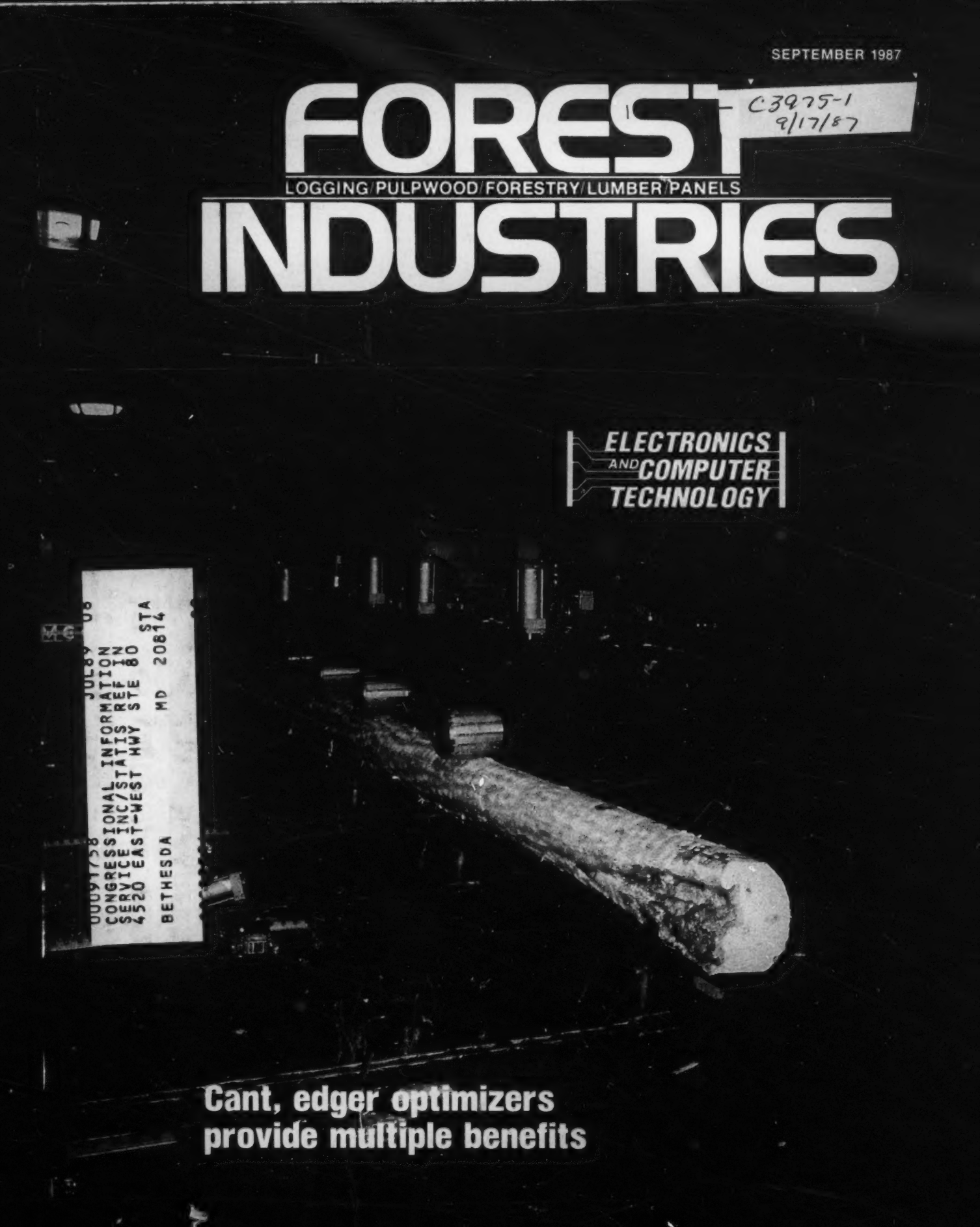
FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS

ELECTRONICS AND COMPUTER TECHNOLOGY



Cant, edger optimizers provide multiple benefits

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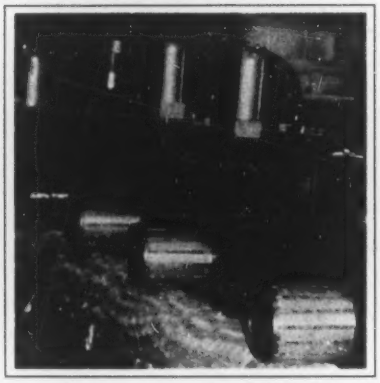

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Housing starts falling behind last year's pace

WASHINGTON, D.C.—Spiced by a 5.7% gain in single-family starts, housing in July eased upward 0.9% from the previous month to a seasonally adjusted annual rate of 1,611,000 units.

Actual starts are running behind last year: 986,200 for the first seven months, compared with 1,104,200 for the comparable period in 1986.

The Commerce Department revised the June rate of starts to 1,597,000 units. July's performance was 9.8% below the rate calculated for July 1986.

Building permits in July slipped 1.9% to a rate of 1,488,000 units, the lowest level since March 1983 and 16.3% below July 1986.

After a 3% fall in June, the rate for single-family units rose to an adjusted 1,159,000 in July. Starts for dwellings with two to four units plummeted 27.6% after rising 29.9% the month before; starts on larger multiple units rose 1.2% in June and dropped 6% in July. ■

Second-quarter figures up for most corporations

SAN FRANCISCO, CALIF.—The second quarter of 1987 produced good financial returns for major publicly held forest products corporations in North America. Integrated firms gave much of the credit for improved sales and earnings to the pulp and paper segment of the business. Solid wood held its own nicely, in a less spectacular fashion than was the case last year.

The accompanying table charts the gains most companies recorded for the second quarter as compared with the same period in 1986. Sales ranged from a negative 2.4% recorded by Potlatch Corp. to an improvement of 57.4% by Stone Container Corp., which acquired Southwest Forest Industries earlier this year.

Earnings were off a fraction of a percent for Champion International Corp., but percentage gains rose into the hundreds for numerous other firms.

On the solid-wood side of the business, most companies expressed satisfaction with second-quarter results.

Income from Boise Cascade Corp.'s building products segment was up modestly compared with the second quarter of 1986 and was substantially improved over first-quarter 1987 results. Wood products demand continues strong, noted chairman and CEO John B. Fery.

Building products enjoyed excellent demand at good price levels during the quarter, said Harry A. Merlo, Louisiana-Pacific Corp. chairman and president. "Most indicators point to a continuation of these strong markets which should lead to favorable third-quarter results as well," Merlo said.

Operating profits for Georgia-Pacific Corp.'s building products segment, at $144 million for the quarter, were down $2 million from last year's all-time record quarter. "For the first six months, however, operating profits rose to $263 million from $248 million in 1966," said chairman and CEO T. Marshall Hahn Jr. "This trend reflects Georgia-Pacific's reduced dependence on new-residential and construction markets. In addition, the acquisition of U.S. Plywood, which we completed in June, increases our access to higher-margin industrial markets," Hahn continued.

Second-quarter earnings for Potlatch Corp.'s wood products group were $6.5 million, a decline from $9.8 million for the comparable quarter last year. Chairman and CEO Richard B. Madden attributed the decline primarily to lower lumber production and expenses associated with shutdown and replacement of the Lewiston, Idaho, sawmill.

Temple-Inland Inc.'s building products group earned $10.7 million in the quarter, as opposed to $12.2 million in second-quarter 1986. This performance exceeded expectations, however.

Building materials showed usual seasonal strength, with lumber and particleboard strong performers for Willamette Industries Inc., said president and CEO William Swindells. ■

U.S., Canadian forest industry results second quarter 1987 ($ millions)

Company	Sales	% change 1987/86	Earnings[1]	% change 1987/86
Abitibi-Price	C756,400	7.8	C36,200	27.0
B.C. Forest Products	C344,100	6.1	C32,400	62.0
Boise Cascade	935,960	0.0	35,230	12.4
Canfor	C314,400	8.9	C26,600	137.5
Champion International	1,161,015	31.5	59,910[2]	- 0.1
Chesapeake	175,045	13.0	7,137[3]	140.0
Crown Forest Industries	C256,000	5.3	C22,800	117.1
Domtar	C657,000	14.5	C44,000	37.5
Donohue	C133,100	16.3	C10,000	138.1
Federal Paper Board	240,990	13.9	8,574[4]	13.9
Georgia-Pacific	2,095,000	8.6	111,000[5]	29.1
Great Lakes Forest Prods.	C183,150	11.3	C20,452	302.0
Great Northern Nekoosa	575,100	14.5	44,900[6]	n.m.
International Paper	1,910,000	55.3	90,000	18.4
Louisiana-Pacific	488,800	24.0	34,800[7]	42.0
MacMillan Bloedel	C806,800	15.5	C74,800	51.9
Pope & Talbot	106,288	39.6	7,211	99.0
Potlatch	243,918	- 2.4	22,317	14.9
Scott Paper	1,029,400	24.1	58,800	4.4
Stone Container	830,900	57.4	32,500	828.6
Temple-Inland	395,100	26.0	35,800	85.5
Union Camp	577,567	15.7	47,812	67.2
West Fraser Timber	C111,400	14.1	C11,900	19.0
Westvaco (4/31)	461,145	5.8	24,299	30.3
Weyerhaeuser	1,769,114	18.2	89,183	30.4
Willamette Industries	352,350	13.7	27,777	43.6

n.m.= not measurable. 1. Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years. 2. 1987 quarter excludes $95.8-million net gain from sale of certain investments and reserve adjustment. 3. 1987 quarter includes $1,075,000 writeoff from plywood plant closing. 4. 1987 quarter excludes $8.3-million charge from early redemption of debentures. 5. 1987 quarter excludes $37-million net gain from sale of Georgia Gulf Corp., includes $6-million pretax gain from stock redemption. 6. 1986 quarter includes $21.2-million net charge for restructuring operations. 7. 1986 quarter includes $4-million pretax gain from sale of sawmill and investment writedowns.